1835

Audio-Visual Materials

THEIR NATURE AND USE

WITTICH AND SCHULLER

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Exploration Series in Education

Under the Advisory Editorship of John Guy Fowlkes

INSTITUTE OF EDUCATION FOR WOMEN.
1835
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Audio-Visual Materials

Their Nature and Use

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Audio-Visual Materials

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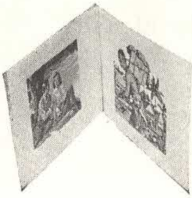

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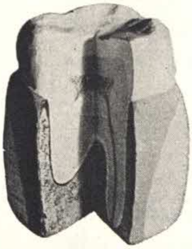

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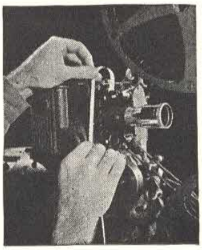

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Editor's Introduction

Seeing and hearing, looking and listening are major ways and means by which human beings learn. Aimed at broader opportunity for learning and more effectiveness in learning, many media have been developed and are widely used in all quarters of the world.

The printing press, chalkboards, tackboards, globes, maps, charts, models, mock-ups, slides, films, filmstrips, projectors, radios, recordings, and television are powerful testimony of mankind's desire to learn and to learn well. These are audio-visual materials which bring the past into the present and crowd the record of years and even centuries into short periods of minutes. These helps to looking and listening make the whole world a real audience of events occurring in all corners of the globe. The story of contemporary life as it is being lived is presented to all men in all nations.

Visual aids to learning have long been used in schools at all levels: elementary, secondary, college, and university. During recent years audio aids have been found in many classrooms. But it was not until after the close of the Second World War that the significance and essentialness of audio-visual materials in teaching and learning were widely appreciated by classroom teachers, school administrators, and laymen.

Sometimes the use of audio-visual materials has been referred to as the audio-visual program in a local school system. Such a designation seems unfortunate since there is an implication that these tools of learning and teaching are "things apart" from the regular curriculum and instructional program of the school. Motion pictures too often have been thought of as "school movies" rather than as "instructional films."

All audio-visual materials related to schools should be recognized as *aids* or as some *ways* and *means* of realizing the objectives or goals of an educational program. Audio-visual materials are not ends in and of themselves, but rather tools of learning and teaching. Since they are tools, these materials must be utilized within and along with the pattern of the instructional program.

The high value and efficacy of audio-visual media in the widest variety of learning and teaching experiences have been firmly established. However, these media should not be used "just to use them." These aids should be utilized only because they have inherent advantages over other means of learning and teaching in given situations.

Audio-visual materials can be chosen wisely and used effectively only if teachers are intimately familiar with their individual, unique advantages and the correct methods of using them. It is therefore clear that classroom teachers along with supervisory and administrative officers in local school systems must "know" audio-visual materials and "know" how to choose and to use them.

This volume is a scholarly but down-to-earth and usable treatment of audio-visual materials—their nature and use. It is illuminating and intriguing. It emerges from the daily experiences of learners and teachers. A host of classroom teachers, school administrators, and producers of audio-visual materials have contributed to this book.

The unique qualifications of the authors are strikingly demonstrated in this treatise on the why, the what, and the how of audio-visual materials. Experienced and prospective teachers alike will find this book stimulating philosophically and highly practical in their role as companions and guides in the process of learning.

John Guy Fowlkes

University of Wisconsin

Authors' Preface

We have been teachers since the early 1930's. We have taught in the intermediate grades, in junior and senior high schools, and have served in administrative and supervisory capacities.

As we worked we recognized that children learn best when they have opportunities to see and hear for themselves, to examine, to manipulate, to question and discuss. One cannot long be a teacher without recognizing that concrete experience is the best basis for all understanding.

As we continued our teaching, we observed that audio-visual methods and materials serve as a very fruitful basis for effective learning, high pupil interest and enthusiasm, and success in school.

In 1944, Mr. Wittich, and shortly thereafter Mr. Schuller on his return from the Navy, accepted positions at the University of Wisconsin. There, in the fertile environment of the School of Education and the Extension Division, both men worked on the university campus and also in the field with able and interested colleagues in training teachers about audio-visual materials—their nature and their use.

During nine years of such work this book was evolved. As a result of these experiences, it has been written in such a manner that classroom teachers may immediately utilize it in daily classroom work. Similarly, student teachers may carry suggestions for using audio-visual materials into practice teaching situations.

Thus, the central purpose of this book is to suggest some ways of more effectively meeting classroom learning problems through audio-visual instructional methods.

Audio-Visual Materials—Their Nature and Use has been completed with the professional assistance of many persons.

The authors are grateful to John Guy Fowlkes, Dean of the University of Wisconsin School of Education and Director of the Summer Session, for his suggestion that this book be produced, for his effective writing of pages 498–503, and most of all for his critical reading of the manuscript and continuing guidance of the writing project.

We express appreciation to Miss Elizabeth Golterman, Director of the St. Louis Division of Audio-Visual Education, and her staff for subject criticism of the manuscript, and to Miss Elizabeth Stitgen of our own staff for her valuable assistance in proofreading.

We value the many conferences and correspondence which influenced the final content of this book. For this we wish to thank Mrs. Margaret W. Divizia, Supervisor of the Los Angeles City Audio-Visual Aids Section; Dr. Fred Harcleroad, Dean of Instruction, San Jose State College; Dr. V. C. Arnspiger, Vice-President in Charge of Production, Encyclopædia Britannica Films; Mr. Floyde E. Brooker, Chief, U.S. Office of Education Visual Education Service; Dr. Seerley Reid, Assistant Chief, U.S. Office of Education Visual Education Service; Miss Martha A. Gable, Assistant Director, School-Community Relations, Philadelphia Public Schools; Dr. Arthur Robinson, Associate Professor of Geography, University of Wisconsin; Dr. Laura Johnson, Professor of Education, University of Wisconsin; and Mr. Guy Michener, Roosevelt High School, Des Moines, Iowa.

Since a book about audio-visual materials needs to rely heavily on pictures, charts, and diagrams, we expressly thank the various individuals and companies who supplied many of the illustrations; specific acknowledgment is made in the captions. The quoted passages used to amplify our ideas are acknowledged in the footnotes.

WALTER A. WITTICH
CHARLES F. SCHULLER

Audio-Visual Materials

1. The Role of Audio-Visual Materials in the Twentieth Century

TRENDS IN THE MEDIA OF COMMUNICATION

In the year 1900 communication was largely by word of mouth. This was in the "day" before the advent of the radio, during the early development of the motion picture, and before television. Since 1900 communication patterns have changed dramatically in almost all social situations, save in the school; the change in trend is indicated in Table 1.1.

The daily newspaper circulation in the United States in 1900 was little more than 9,000,000. Within ten years this number had trebled. Today newspaper circulation is more than 52,000,000. Present-day newspapers with an increasing number of pages per edition roll off the presses in thousands of communities in morning, noon, and evening editions. Large type, white space, and startling headlines bid for reader interest morning, noon, and night—an incessant, day-in-and-day-out, repetitious demand for attention.

To the newspaper we must add the influence of the magazine. At the turn of the century less than 226 magazines were being published, with a total circulation of 23,000,000. Within ten years this number had greatly increased, and today over 6000 magazines with more than 208,000,000 circulation appear in offices, on the newsstands, and in our homes. More than one magazine subscription for every man, woman, and child, or approximately six magazines per family, come regularly into America's homes. Magazines today are characterized by all manner of attention-attracting devices. Picture magazines attractively supplemented with color intrigue the reader and arrest his interest. The modern magazine with its demanding format is a far different reader medium than the best of our current textbooks, which by comparison often appear drab.

TABLE 1.1. EXTRA-SCHOOL TRENDS IN COMMUNICATIONS MEDIA

	1890	1900	1910	1920	1930	1940	1950
Percent of literacy among Americans 10 years and older	86%	89%	92%	94%	95%	96%	97%[a]
Daily newspaper circulation (in millions)	4.5	9.3	(1914) 25.4	27.7	39.5	41.1	(1949) 52.0
Radios used in homes (in millions)				(1922) 0.6	13.7	28.5	(1948) 37.0
Total radios in use (in millions)				0.6	14.7	45.0	(1948) 73.0
Known magazine circulation (in millions[b])	140 mags. to 7.1 million cir.	226 mags. to 23.8 million cir.	154 mags. to 34.4 million cir.	191 mags. to 52.8 million cir.			(1946) 549 mags. to 208 million cir.
Feature-length motion pictures produced					(1935) 564	523	450[c]
Television receivers in use							5,000,000[d]

Source: *Mass Communications,* Institute of Communications Research, University of Illinois, 1949.

[a] Estimate.

[b] Only magazines of known accurate circulation; 6000 magazines were actually published in 1946.

[c] *Motion Pictures and Filmstrips Catalog,* Parts 12–13 of the *Catalog of Copyright Entries,* Library of Congress, January–June, 1950; July–December, 1950.

[d] Wayne Coy, "The Present Status of Television," *Journal of the A.E.R.,* March, 1951.

Prior to 1920 a radio ownership census was not considered worthy of public accounting. In 1920 less than a million homes were equipped with radio receivers. Today over 73,000,000 radios are in use—almost two sets for every home. Radios now begin their daily routine of newscasts in the dark hours of the early morning. They blare through mornings of "perpetual" emotion, soap operas, and serial stories. Radio programs vie for the attention of 150,000,000 listeners with musical comedies, orchestras, symphonies, mysteries and serials of high emotional appeal. The educational use of radio, well established in some sections of the United States, is relatively neglected in the schools to which most of our children go.

Today the communication techniques of the average American community are being increasingly supplemented through telecasting. Any teacher or parent who has observed the attention-getting and -holding influence of television as it affects the interest of children can easily appreciate its importance as a communication device. Television is not an addition to man's technique in communicating ideas. It is rather a synthesis of all that he has learned about the printed page, the recording of sound, the ability to capture motion in film form, and finally the tremendous impact which occurs when all these media are welded into one dynamic force. Television is the fusion of many means of communicating information. The child who sits before the televised program of "Beanie and the Serpent" is held enraptured in the grasp of a many-sided demand for attention—visual and auditory. The same child will put aside even more basic demands for food and rest as he insists on continuing his identification with heroes and heroines, both human and imaginative.

Television is yet too young even to be a part of census statistics. Television, however, as it speaks directly to and for the benefit of the listener and hearer, becomes a means through which the viewer actually participates in the ideas or information on the program. Television intrigues the viewer by means of every trick of mass communication developed within the last fifty years. Although this new medium is being experimentally investigated in a few isolated school situations, educators in general have not incorporated it in the classroom learning environment.

To all of this add the phenomenon of the motion picture. Each evening as darkness descends, the marquees of nearly 17,000 motion-picture theaters flash into brilliance announcing single, double, and triple features. Motion pictures are currently produced at a rate of over 450 a year. Entertainment films, Grade A, B, and questionable, employ every trick of communication man has devised. Yet a study of film use in schools in the state of Wisconsin, where educational films are acknowledged to be widely used, reveals that only one teacher in six uses this medium regularly.[1]

Amid this clamor for the attention of man's eye and ear which typifies the "pull" of newspaper, magazine, radio, television, and motion picture, the school attempts to conduct its orderly revelation of the world environment. But it does not fully use the communication techniques which commercial agencies are devising to ensnare and hold the attention of individuals—of "learners."

---

[1] *Survey and Analysis of Audio-Visual Programs in Wisconsin Schools, 1948,* conducted by the Wisconsin Department of Audio-Visual Instruction and the Bureau of Visual Instruction, University of Wisconsin.

Those who teach, supervise, and administer schools might well ask themselves these questions:

In the light of mass-communication techniques currently developed, is the voice of the school being lost?

Are there in today's communication techniques methods which lend themselves to the more efficient presentation of socially worth-while information that currently comes within the domain of the school curriculum?

It is time that the school attempt to rescue itself from the possibility of losing its voice in the welter of mass-communication techniques. It is time that the school attempt to ascertain whether or not there are *some* mass-communication techniques typical of today—radio, television, press, the magazine—which in part at least may be effectively applied to the day-to-day work of the school.

Unless the school can communicate in an interesting, profitable way with its learners, there is little chance that many educational goals will be accomplished.

THE CHANGING SCHOOL POPULATION

The learner of the 1890–1900 era of necessity became accustomed to understanding what he could of his environment through verbalistic materials. Let us describe him and then contrast him with the child who lives in today's complicated world of communication techniques.

The child of 1890, in a typical situation, completed an elementary-school experience which placed emphasis on his ability to read, to spell, to write, and to do simple arithmetic. This emphasis on reading, spelling, and writing demanded a high level of attention to detail and to mechanical perfection.

When this child left the elementary school, he usually could read well largely because of the emphasis which his school placed on the printed word. From constant attention to the textbooks of that day he learned about his environment via the printed word. Following grade school he more often than not went on directly into a life situation or if he was one case out of twenty-five he went to high school to prepare himself for college entrance.

Because he was one in twenty-five, he was probably endowed with a high degree of intellectual curiosity. He became well trained by the standards of that day, not entirely because of the techniques of that time but because *he represented a highly selected portion of the potential school-going age group*. He was well above the 90th percentile in ability and intellectual curiosity. He was willing to undergo the tedium of *memoriter* learning techniques. He was willing to pore for long hours over the textbooks of the period, which were often characterized by poor authorship, unattractive format, and questionable accuracy of information, particularly in geography and science.

TABLE 1.2. TOTAL SCHOOL ENROLLMENT in the U.S.

	1890	1900	1910	1920	1930	1940	1950[a]
Children of elementary age, 5–13	13,188,000	15,385,000	17,019,000	19,992,000	22,230,000	20,024,000	22,529,000
Children enrolled in public elementary schools	14,181,000[b]	16,224,000[b]	18,457,000[b]	20,864,000[b]	23,588,000[b]	21,044,000[b]	19,905,000
Children of high-school age, 14–17	5,255,000	6,019,000	7,220,000	7,736,000	9,341,000	9,781,000	8,571,000
Children enrolled in public high schools	202,000	519,000	915,000	2,200,000	4,399,000	6,601,000	5,557,000
Percent of high-school-age children enrolled in high school	4%	8%	13%	28%	47%	69%	65%[c]

Source: *1944–46 Biennial Survey of Education in the U.S.*, U.S. Office of Education, and *ibid.* for 1946–48.

[a] U.S. Office of Education estimates as of July, 1951.

[b] Higher enrollment figure due to overage children.

[c] Temporary change in trend due in part to military training.

Today, nine out of ten children of elementary-school age are in the elementary schools of America. At the high-school level, approximately 75 percent of the children of high-school age are enrolled in high school. Total enrollment figures from 1890 to 1950 are shown in Table 1.2. No longer can we say of all these children that they represent a segment of the possible school population that is highly "skewed to the right of the normal curve." No longer can we expect from them the degree of interest, intellectual curiosity, or mental discipline inherent in the 1890 school enrollees. This situation poses a fundamental problem in instructional techniques. How can the responsibility of the schools of today be more effectively met? How can increasing areas of socially important information concerning an ever-widening world environment be made known and understandable *to all the children who are in school?*

Many of today's schools continue to be "reading" schools. This often represents an unfortunate situation, not because learning from printed words is bad but rather because the readiness experience necessary to understand the words has not been provided. In order that reading experience may be most successful, a broad background of readiness experience must precede the study, perusal, and interpretation of the printed word. The problem of providing the background experiences necessary to achieve real understanding increases as the things we study represent areas remote in time or place.

In too many instances the school of today is operating too nearly in the pattern typified by the 1900 school. It is a reading school, it is a verbal school, a school which is carrying over too many of the ineffective techniques of the preceding century and which in today's communication world can no longer be condoned.

In contrast to the 1890 school child, let us consider today's child. The school child of today moves in a communication world which emphasizes objectivity, visual presentation, and graphic portrayal. Within the brief space of thirty to fifty years, communication grew from a verbal, reading, or word-of-mouth stage into a world that is characterized by an environment of sharp visualization which *demands* the attention of the individual. In today's communication world there are scores of voices which are much more successfully heeded than is the voice of the school.

This state of affairs is partially revealed in a study entitled *Early School Leavers.*[2] In it appears the following table entitled "Reasons Given by 957 High-School-Age Youth as to First Importance in Their Decision to Leave School."

1. *Reasons Relating to School*	
Preferred work to school	36%
Not interested in school	11%
Couldn't learn, was discouraged	7%
Was failing, didn't want to repeat	6%
Disliked a certain teacher	5%
Disliked a certain subject	3%
Could learn more out of school than in	1%
2. *Financial Reasons* (clothes, spending money)	21%
3. *Personal Reasons* (health, parents, friends)	10%

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[2] National Child Labor Committee, *Early School Leavers,* Dillon, New York, 1949.

In approximately two-thirds of these cases of withdrawal from school, disinterest of one sort or another in school was the reason. Such headings as "Disliked a certain teacher," "Disliked a certain subject," "Not interested in school," give evidence of this.

The heading, "Preferred work to school," is a simple statement to the effect that of the two alternatives, school or work, work seemed more attractive. The heading, "Couldn't learn, was discouraged," is another way of saying that in many cases the teaching methods employed by the school were not adequate.

One can only surmise the extent to which communication failures were responsible for the attitude which allowed these youths to withdraw from school. Certainly, these young people found all around them more attractive opportunities than they found in school.

Does not all this point again to the strong possibility that the techniques by which we are communicating information, ideas, and skills to learners need careful examination? There is reason to believe that the instructional methods we are employing today approximate too closely the traditional verbalistic techniques typical of the 1900 school and *not those which will stand up in competition with the communication techniques that exist all about us* in the extra-school world.

As we examine the instructional tasks which confront the teacher, let us ask: Among the many modern techniques for communicating ideas which man has developed, can we find more interesting and effective ways of presenting socially important information about today's world to today's school children?

Transcriptions, sound motion pictures, charts, bulletin boards, maps, globes, slides, and filmstrips can be effective avenues to learning. These can be used to help create more effective learning situations. Knowing the school's instructional responsibilities, let us examine the communication world which lies outside the school and from it adapt to the use of the schools the techniques that can help make school work more effective.

There are many current communication techniques which can be effectively used in implementing the curriculum of the school. Many such techniques will be useful, not to replace tried and tested teaching materials and methods but rather to supplement them effectively. It is the purpose of this book to show how this may be done.

CHANGING CURRICULA—NEW TOOLS OF TEACHING AND LEARNING

The curriculum of the school must reflect the society it prepares youth to enter. The school's primary responsibility, to communicate understandings of contemporary society to youth, is becoming more and more difficult.

Progress in almost all fields of human endeavor is tremendous. In 1900 no more than 300 job classifications were listed by the federal census. Today the number is 3000. The scientific inventions since 1900 are more fundamental and more numerous than all those made in the history of man before that date.

The rise of industrialization and its accompanying need for raw materials brought from every corner of the world have opened up trade relationships with peoples unknown to the average citizen fifty years ago and still unknown to many of us today.

The fields of art, literature, and handcraft have revealed the artistic and creative work of people living in the heights of the Andes, the flats of the muddy Congo, and the steaming rain forests of the Malay Peninsula.

All through this, the usual curriculum sequence in social studies, science, and language arts has "slogged along," perpetually behind in the race to keep abreast not only of past accumulations of information but, more important, of current developments in the affairs of men everywhere over the face of the globe.

At the onset of World War II the usual elementary social studies text was concerned with the analysis of peoples of European backgrounds. This very logically grew out of the analysis of a 1900 society which revealed that most of the people in it were descendants of those who came from Europe, England, and the Mediterranean areas. World War II illustrated graphically how current factors can invalidate static values. The same students who during school methodically and laboriously read about people who came from the "type" countries of Europe read news items in the evening paper or news magazine about people and places never mentioned in their formal school work.

During World War II the contribution made by the people of the Andean regions (copper and nitrate production to ease Allied war shortages), by little-known tribes of the Malay Peninsula (who aided in cutting off the southeasterly advance of the Japanese), and by people of the islands of Polynesia, Micronesia, Melanesia (on which the battles of the Pacific were fought) suddenly rushed them into positions of prominence which can no longer be ignored. For this reason, should the orderly investigation of the "type" countries of the world be discarded? No. Rather, we must now add new areas of subject content to our schools' responsibilities. And as more and more responsibility is assumed by today's schools, we may well search for more effective teaching techniques.

In the area of general science, nature study, chemistry, and physics, old text materials are being hastily rewritten. The textbooks of ten years ago did not mention jet propulsion. They did not include an understandable graphic explanation of the radial-type airplane motor. The text of the 1940's said nothing about heavy water, atomic fission, or the relationship between the cosmic energy of the sun and our current discoveries in atomic energy.

Should the old be deleted? No. To it, the new must be added.

Many of us are still using maps of the South Pacific which present that region as a vast uncharted stretch of blue water. Look at your own maps when you get back to the classroom. We know that in this vast uncharted mass of blue the major battles of World War II were fought.

Look to the north as we analyze current news items in the magazines and newspapers concerning the strategics of a forthcoming possible conflict. In the current news magazines we see references to polar distances and polar routes. How many of the maps in our classrooms are Mercator projections (oriented along the equator), a map projection which was invented by a sailing-vessel navigator over three hundred years ago when all surface navigation depended on compass direction alone? Unfortunately, this map is still in use in many of our schools today, whereas other orientations with focal points over the North Pole, over Asia, or over the Atlantic Ocean are now necessary. Many of our traditional points of view, preserved for no other reason than because of tradition, must now be reanalyzed.

In the case of history, we look in vain in schoolbooks for materials concerning the backgrounds of Genghis Khan, Tibet, Korea. We know little about China's history and current culture. A new and potentially powerful social order is developing in India; but what do we know about the history of that country and the millions of people destined to take a prominent place in the world of affairs tomorrow?

Rather, our study of history has been concerned with the traditional European background. This study includes ancient history, modern European history, English history, and history of the United States.

Should we discard this emphasis? No. But let us ask ourselves what we need to add for the good of young learners who will soon take their places as citizens in the "one world" of tomorrow.

Contemporary achievements and advances in vocational crafts, technological improvements in the techniques of home economics and home management and foods, skills in intramural sports, individual and team games in physical education and recreation, and progress in health, in safety—no matter what area of the curriculum we examine, the trend seems to be uniform. There is more and more to know—more and more of social importance, more and more experience which the learner must be given before he can assume full and desirable social participation in the rapidly expanding world of today and tomorrow.

In the last half century the United States has expanded into an industrial civilization which depends on the nations of the world. It is no longer the self-sufficient community of a century ago. It is no longer the booming laissez-faire industrial community of fifty years ago. Today it finds itself in a position of world interrelationships to a degree which even the most liberal-minded of the frontier thinkers at the turn of the century would not have dared anticipate.

In order to take cognizance of this, the curriculum is being expanded in terms of courses and subject content beyond anything that was dreamed of in the past. In order to meet this situation, state after state in the Union has increased the number of years the young learner is required to remain in school.

Since 1900, the required age of attendance has been increased from 14 to 18 years. The person who contemplates entering a highly skilled vocational pursuit or a professional area may look forward to reaching the age of 25 to 30 before he has attained enough formal educational experience to take his place with his co-workers. Within the period 1900–1950 the number of courses offered by the large metropolitan high school has increased over 300 percent. It would scarcely be possible within one lifetime for a given student to participate in all the courses offered in some of our largest urban technical high schools.

While the number of courses has increased, the learning material of prime importance up to this date, the textbook, has increased both in number and in number of pages. "In one series of textbooks which I checked, I found that on the average the content of our arithmetic text has increased by 25 percent; our social studies and geography texts have increased by 125 percent. Not only was the number of pages increased but the sizes of the pages as well. The best-selling fifth grade geography in the United States requires the teacher to teach over 1,000 concepts."[3]

Today the American school steadily finds itself with more and more subject information to teach. Of necessity the child spends more time in school. Reliance on the chief instructional material, the textbook, has caused the average textbook to increase in size in terms of pages and page size. *And still, vast areas of our world environment are not currently included in formal education course sequences.*

This situation leads directly to a searching inquiry on instructional procedures, basic information techniques, the effectiveness of currently used instructional materials, and the role of the teacher who faces an ever-widening responsibility for ever-increasing proportions of the school-age children who are coming to him for instruction. Along with this trend the lay public is voicing a continually mounting demand that the schools train young people more adequately to take their places in a contemporary world that is more demanding, more difficult to understand, and requires more from the learner than ever before in history.

In this situation it is suggested that the teacher examine the role of audio-visual materials of instruction in terms of their ability to interest more completely the average child who is in school today, more effectively instruct him in the educational goals that have been chosen for him to attain, and more lastingly equip him with that socially desirable information which may be of use to him as he takes his place in the society of tomorrow.

SUMMARY

The American system of public education is a unique social invention found only in the United States. Inherently characteristic of this system is universality of educational opportunity.

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[3] Floyde Brooker, "Communication Awareness and Current Social Responsibility," *Proceedings of the Sixth Annual Visual Education Institute,* Univ. of Wisconsin, Extension Division, July, 1948, p. 7.

Education in the United States has always reflected the society it serves. Originally, as an outgrowth of a frontier society, emphasis was placed on survival on a frontier. As the public school was carried westward, it accurately reflected the mood of the people of the frontier. The school characterized a laissez-faire society and became a symbol of democracy and an ideal.

The United States is unique among the countries of the world in providing public education to all its people. It is public education which has helped to achieve the high standard of living which this country has. Today the schools are confronted with the grave responsibility of evaluating their effectiveness in interpreting the demands of our contemporary society to the learner.

Educational opportunity for all means bringing all the children of all the people into schools. This has created a situation in which the character of the average school pupil has changed markedly if we compare the 1950 elementary and high-school pupil with the 1900 elementary and high-school pupil. The pupil of today is the product of an entirely different environment than was his counterpart of 1900. Today's pupil represents a wider variety of inherent ability and range of interest than did the 1900 pupil.

The school curriculum today embraces responsibilities which were not even thought of in 1900. Increasing amounts of socially useful information come within the curriculum responsibility of today's school. Areas of the world previously given no consideration in school must now be studied because of their contemporary social importance in all fields of human endeavor. In the fine arts, the social studies, science, home economics, and industrial and vocational art, great advances in accomplishment and techniques have been made which must be given consideration.

A communication revolution has occurred in the last fifty years that is typified by the attention-demanding and communication techniques of radio, press, magazine, television, and theater. The school stands in the midst of this communication revolution and must be realistic in inquiring what its effects are on the habits, interests, and motivations of the average child in school today.

The schools of today lag far behind contemporary society in developing techniques for the dissemination of information. They find themselves confronted with vastly increased areas of socially important information to be made known to youth. The schools of today are open to greater numbers of students of widely varied interests and aptitudes.

These three developments will cause every thinking school teacher, supervisor, and administrator to ask himself such fundamental questions as: Am I sure that the educational objectives I hold today are socially important? Am I sure that the procedures I am using to help the pupils with whom I work become informed in terms of socially acceptable information and objectives, are being presented through effective instructional techniques?

One important means by which instruction can be improved is to be found within the area of audio-visual materials and techniques and their relationship to the more effective accomplishment of the goals of the modern school curriculum. It is to this end that this book has been written.

Suggested Activities

1. Compare the format of the modern textbook with that of older specimens you will find in the curriculum library, the school textbook depository, or the school or public library. Take into consideration such aspects as page size, type readability, presence or absence of pictures, style of writing, etc. Report your findings.
2. Compare course of study topics in current curriculum outlines with course of study topics listed in such outlines ten, twenty, thirty, and possibly forty years ago. These courses of study will be found in the curriculum laboratory or in the instructional materials files of your local school system. Report your findings.
3. Arrange interviews with civic leaders in your community. Ask such questions as these:
    a. In your opinion, have the schools of this community changed very much since you went to school?
    b. What school experiences were most helpful in preparing for your life in the community?
    c. What subjects did you like best? Why?
    d. How did you study history, geography, etc.?
    e. What do you like best about today's schools?
4. Conduct an interview with the local school superintendent or high-school principal to discover the following:
    a. To what extent has the number of courses offered during the last twenty years been increased?

b. How do students enrolled twenty years ago compare in intelligence, interest, general attitude, etc., with the students who come to school today?
c. To what extent has attendance in this high school changed over the last twenty years?
d. How many freshmen stay to graduate? Why do students drop out?
e. How do the percentages of children of school age actually enrolled in local elementary and high schools compare with the national percentages listed in Table 1.2? What implications does this comparison have?

What conclusions can you draw from this interview?

5. Interview your fellow students and a sampling of high-school students, and ask such questions as these:
   a. What and how many newspapers do you read regularly?
   b. How much time each day do you spend listening to the radio?
   c. How much time do you spend on television?
   d. How much time do you spend reading magazines?
   e. How many motion pictures do you see per month?

   After you have completed your interviews, what are your conclusions?
6. Make a survey of the radio habits, movie habits, television habits, and magazine and newspaper reading habits of a group of elementary-school children. Interview them and ask the questions in 5a–e above. What are your conclusions?
7. Interview several teachers in the elementary school, high school, or college and ask them the following questions:
   a. Do you use maps and charts in classroom work?
   b. Do you use motion pictures to illustrate subject content?
   c. Do you use filmstrips?
   d. Do you use radio programs?
   e. Do you use transcriptions and recordings?
   f. Do you study the resources of the community which relate to your subject?

   After you have completed your interviews, what are your conclusions? Report your findings.
8. Ask the high-school principal to help you locate the names of students who have dropped out of school during the preceding year. Arrange among yourselves to interview these students to discover:
   a. Reasons for leaving school.
   b. Attitude toward school work.
   c. Best-liked teachers.
   d. Best-liked school activities.
   e. Least-liked school activities.
   f. Things about school that could be improved.

   Following these interviews, prepare a digest of the findings and report to your class. What are the implications of your findings for Questions 7 and 8? Does any relationship exist?

9. Arrange for the viewing of the following films. Provide time for discussion of them.
   a. *School House in the Red,* Sound, Color, 43 min., W. K. Kellogg Foundation.
   b. *Wilson Dam School,* Sound, B&W, 20 min., TVA.
   c. *Children Must Learn,* Sound, B&W, 14 min., NYU.
   d. *And So They Live,* Sound, B&W, 24 min., NYU.
   e. *Better Schools for Rural Wisconsin,* Sound, Color, 29 min., Univ. of Wis., Bur. Vis. Instr.
   f. *Achimota,* Sound, B&W, 19 min., BIS.
   g. *Nomads of the Jungle* (*Malaya*), Sound, B&W, 22 min., United World.
   h. *Farmers of India* (The Middle Ganges Valley), Sound, B&W, 22 min., United World.
   i. *Sampan Family,* Sound, B&W, 16 min., International Film Foundation.
   j. *Problem of Pupil Adjustment,* Part 1, *The Drop-Out;* Part 2, *The Stay-In,* each B&W, 19 min., McGraw-Hill.

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Survey and Analysis of Audio-Visual Programs in Wisconsin Schools, 1948, conducted by the Wisconsin Department of Audio-Visual Instruction (W.D.A.V.I.), and the Bureau of Visual Instruction, University of Wisconsin.

2. How People Learn

Recently the editors of *Parade* called together three staff artist-illustrators. They were experts. They made their living by visualizing ideas. The editors reported as follows:

> We asked them to draw an animal described by that very complete authority, the *Encyclopædia Britannica:*
>
> "The body is stout, with arched back; the limbs are short and stout, armed with strong, blunt claws; the ears long; and the tail thick at the base and tapering gradually. The elongated head is set on a short thick neck, and at the extremity of the snout is a disc in which the nostrils open. The mouth is small and tubular, furnished with a long extensile tongue. A large individual measured 6 ft., 8 in. In colour it is pale sandy or yellow, the hair being scanty and allowing the skin to show."[1]
>
> Our artists' rather befuddled efforts are shown [in Fig. 2.1].
>
> Now compare them with the aard-vark pictured [in Fig. 2.2]. It proves that *even the most precise words do not convey an idea as graphically as a single picture.*[2]

Notice how the three artists visualized the phrase "arched back." Observe their graphic interpretations of the "extensile tongue," and of "the hair being scanty and allowing the skin to show."

Obviously the meaning given these words was related to varied indi-

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[1] See aard-vark, in *Encyclopædia Britannica,* Senior Volume I, p. 4.

[2] *Printer's Ink,* April 1, 1949.

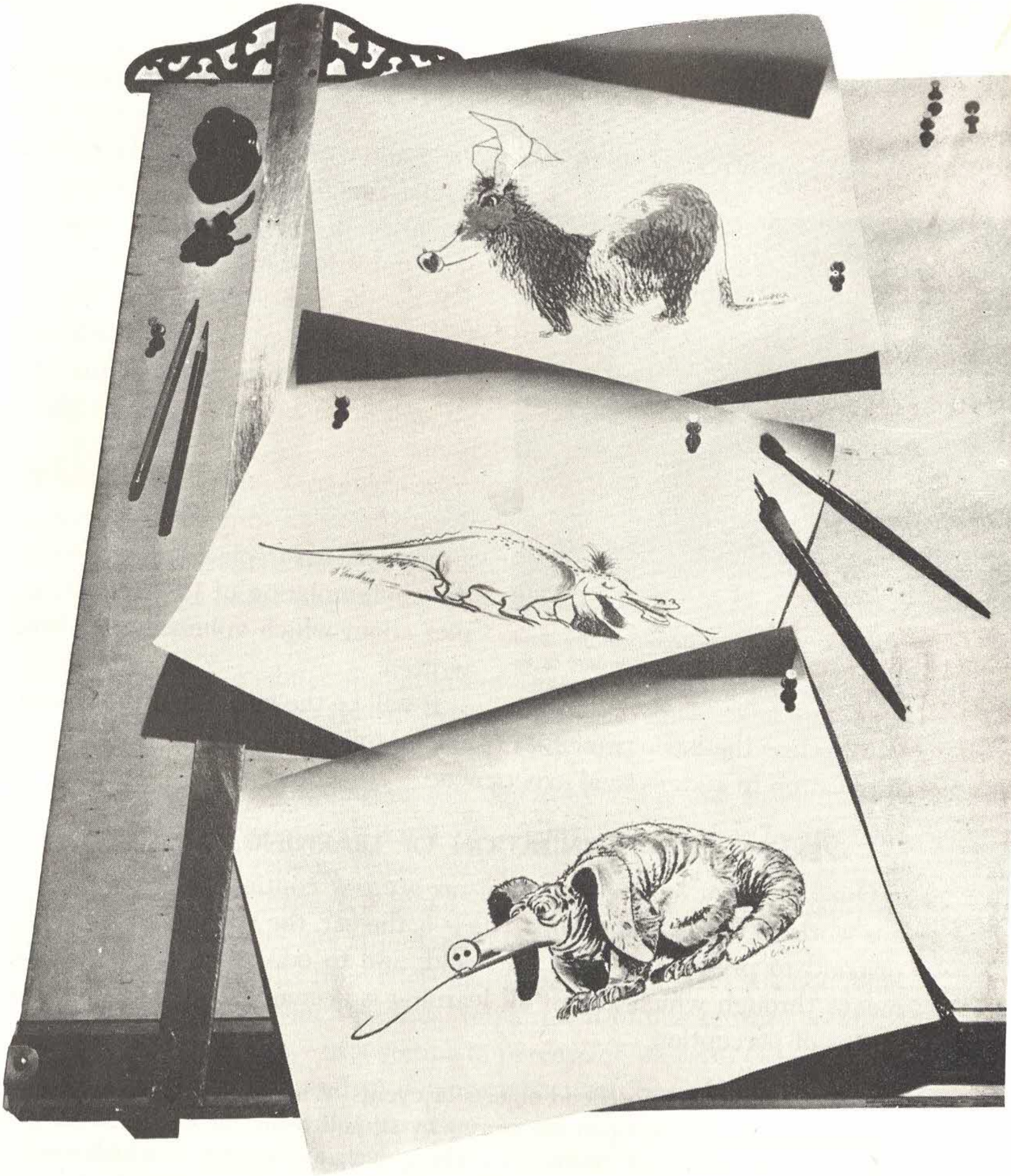

Fig. 2.1. These three drawings were inspired by the same verbal description. (Courtesy of *Parade*, The Sunday Picture Magazine.)

vidual experiences. None of the men had seen an aardvark. They had seen other animals, however. To one man the phrase "hair being scanty" recalled his previous acquaintance with elephants. To another this same phrase recalled an encounter with an opossum. Since the meanings varied with the individual's experiential backgrounds, variations in visualizations occurred.

If such variation in interpreting the printed word is apparent among adults, imagine what bewilderment can arise in the minds of younger, more naïve learners.

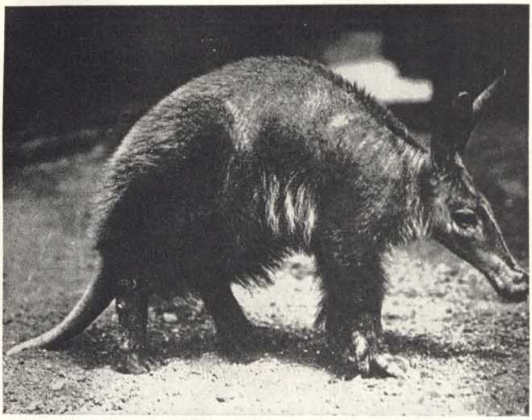

Fig. 2.2. Visual experience with the aardvark gives meanings to the *words* used to describe it. (Courtesy of Keystone View Co.)

Why do these difficulties occur? This challenging question confronts every teacher who attempts to unravel the problems he meets in the classroom.

Learning is a complex process. To discuss such an important process in a short space is to place restrictions on the contemplation of learning principles about which volumes have been written.

It will be the purpose of this discussion to describe basic principles of the learning process in terms of their application to audio-visual experience.

PERCEPTION—FOUNDATION OF LEARNING

Our perceptor sensory mechanisms are our continuing contacts with our world of things and events. The eye, the ear, the nerve endings which respond to pressure, to heat and cold, and to odors and tastes are the means through which almost all learning is accomplished. They are the means of perception.

> In perception we apprehend objects or events. When we perceive, we translate impressions made upon our senses by stimuli from our environment into awareness of objects or events. . . . The objects and events of which we become aware are regarded in perception as present and as going on. This activity of perceiving is such a universal and intimate feature of our mental life that it is often difficult to realize that objects of the physical world do not merely present themselves and that we do anything more than open our minds to receive them as they really are. It is easy to overlook the fact that we construct our world of things and events out of our sensory processes and that physical objects as we know them through sight, sound, taste, smell, and touch are products of our own perceptions. . . .

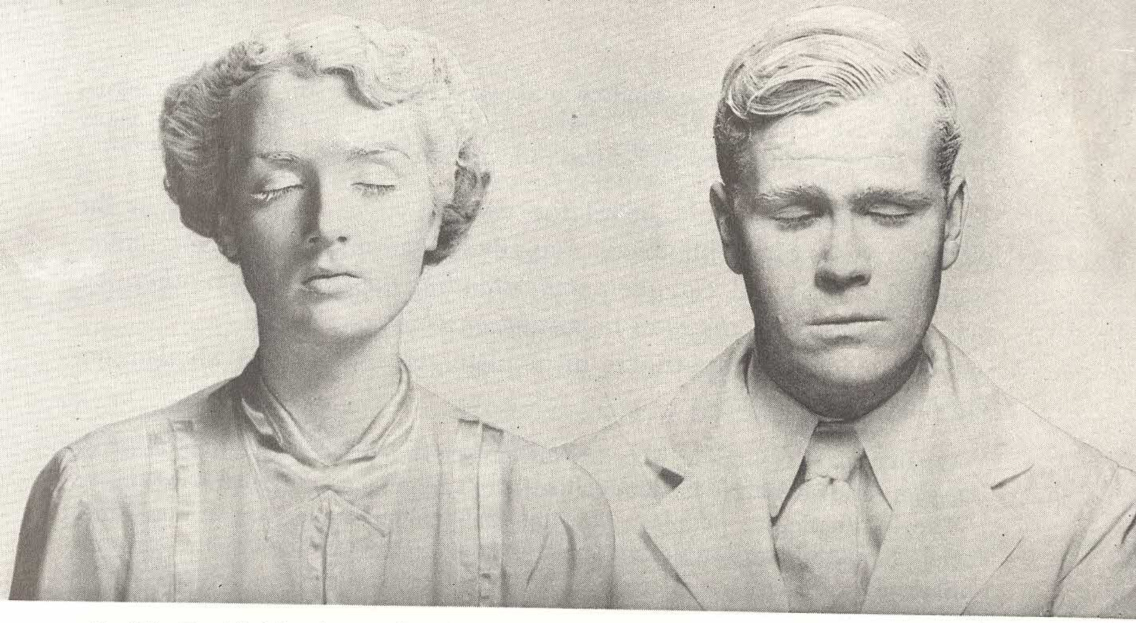

Fig. 2.3. The blind imagine people to have similar expressions. (Courtesy of *Parade*, The Sunday Picture Magazine.)

Widely differing qualities of sensory experience depend upon the organs of sense and upon the nervous system. They are the basis of our knowledge of the world about us. Without them, there would be no awareness of anything.[3]

The normal learner, insofar as the functions of his perceptor mechanisms are concerned, gains understanding in terms of multiple impressions recorded through eye, ear, touch, etc. These functions do not occur in isolation but rather through a blended pattern of any or all of the perceptor mechanisms that are stimulated by external occurrences.

Understanding results from coördinated perception. This phenomenon is proved by cases in which physical impairment of one sensory receptor eliminated the possibility of a complete perception pattern. Case records tell of vision being restored to persons who were born blind. Upon receiving sight these persons at first experience a confused array of colors, strange shapes, and shadows which they are not able to understand or interpret.

> One such person was given sight at the age of eighteen by surgical operation. He reported that when light first flooded his eyes everything seemed hazy with no definite forms or arrangements. . . .

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[3] Howard L. Kingsley, *The Nature and Conditions of Learning*, Prentice-Hall, New York, 1947, p. 262.

> The doctor took him to a window, and asked him if he saw the hedge across the street. He replied, "No, sir," for he had no idea which among the many strange forms was the hedge. He had to learn what a hedge looked like.[4]

This man had no doubt heard the word "hedge" many times in the eighteen years of his blindness. Actually he had attained no true understanding of the word. *Complete understanding depended upon other perceived experiences, the most important of which was visual.*

Other evidences of partial or incomplete perception reveal similar conclusions:

> When a man is blind, he does not always see things as they actually are, but one thing is evident. He instinctively attempts to get a mental picture of things.
>
> The blind picture people as having identical masklike expressions. Since facial characteristics are not apparent to touch, they cannot visualize frowns, smiles, or expressive eyes [see Fig. 2.3]. Neither can they understand why a man's face or shirt seem a different tone since both are called white.[5]

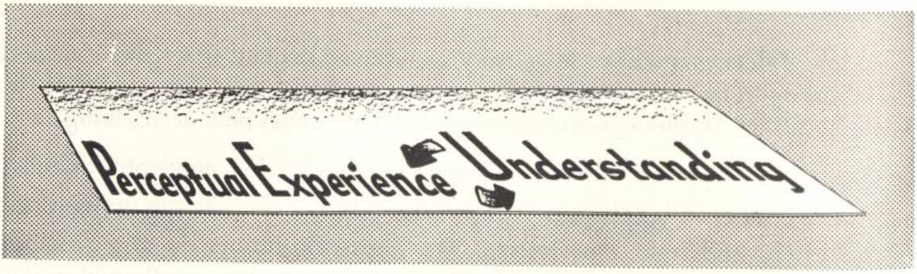

Fig. 2.4. Understandings emerge from experiences.

Effective perception is thus a blending of sensations which then gives rise to thoughtful shuffling, arranging, and selection of a pattern. This pattern may be thought of as an understanding of an event or object. The process may be visualized as shown in Fig. 2.4.

PERCEPTION—BASIS OF THINKING

Adults, of course, are better thinkers than children, for the latter are guided in their thought by literal applications or limited applications of perceived experience. In thinking, the learner is limited by the number, variety, and scope of perceptions already experienced. Thus the learner who has it within his ability to draw upon a wide variety of background experiences which he can recall at will is apt to be more effective in his thinking than the learner who does not have this broad background.

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[4] *Ibid.,* p. 273.

[5] *Sales Management,* June 15, 1949.

During the thinking process the learner is ordinarily confronted by a problem to be solved. If the problem is clearly understood, if it is interesting and challenging to the learner, if it is not so difficult as to discourage him, he will begin to search for and select appropriate understandings which may apply to the ultimate solution of the problem. He will be able to *recall* understandings, or he may have to search for new information through *new perception*—reading, interviews, observation, and examination. Soon he will choose an answer; or, failing to do this, he will give up and leave the task unfinished.

What actually happens in such a thinking process may be illustrated by a second-grade child's search for understanding of how wool is grown and made into the cloth out of which his own clothing is cut. (See Fig. 2.5.)

In the intermediate grades children study the story of wool and woolen textile manufacture. Few children approach this study with much more than a superficial experience with wool.

A child may touch the woolen fabric of his clothing and get experience with texture. He may observe the fact that the cloth, first seen as a gross mass, is made up of tiny threads. On pulling one of these threads apart, he can see the minute but single strands of wool. His interest may be aroused.

Immediate understandings of color and texture, even a superficial understanding of what weaving means, have been gained through first-hand perception. Problems come to mind: How are the various colors added? What is the relationship of the single fiber to the little bundle of fibers which make up the thread?

To answer these the child begins searching through his own past experiences with woolen fabrics. He may recall none; but if he is interested, he will respond to his own need or to his teacher's suggestions that he gain further experience with wool.

What avenues are available to him?

He may read. But as he reads, he will find that he is taken farther and farther afield from first-hand experience. In trying to understand such words as "Australia," "sheep ranch," "wool exchange," "warp," "woof,"

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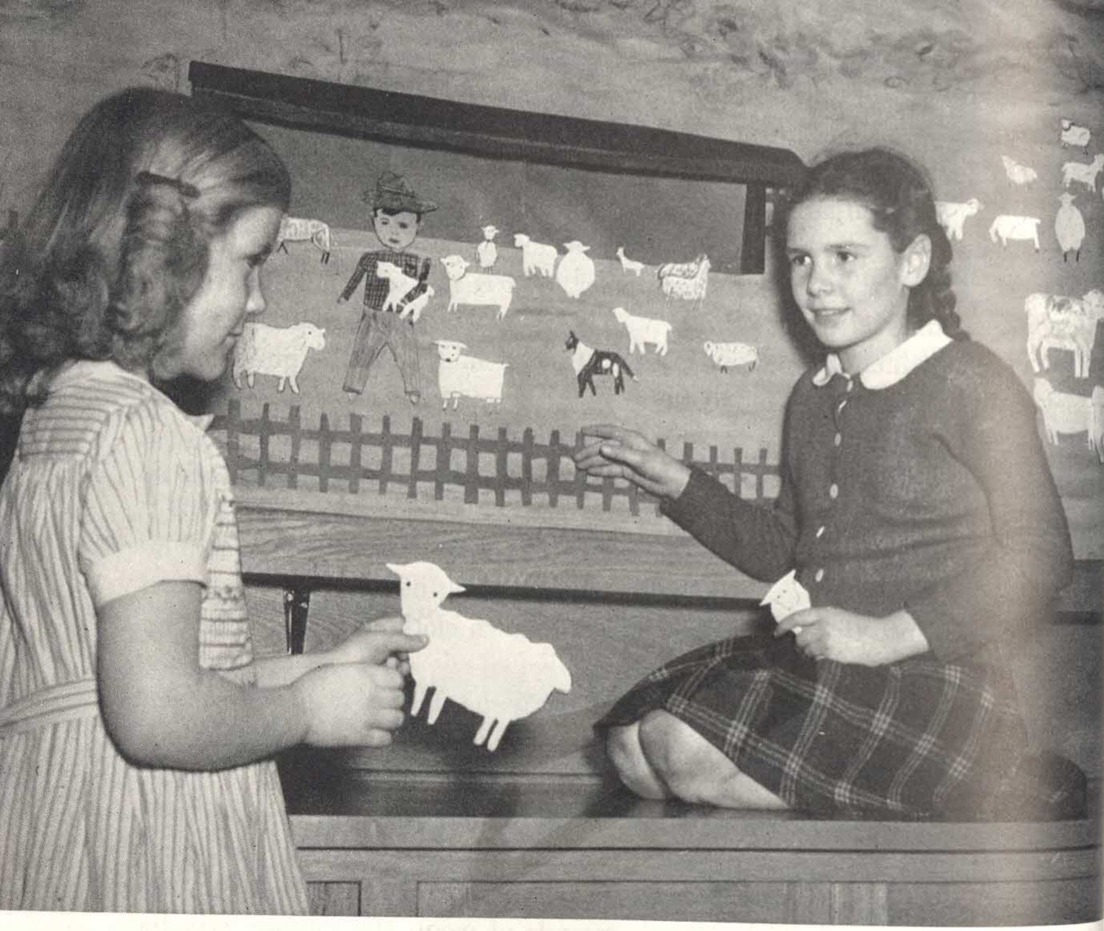

Fig. 2.5. Concrete experiences with wool help these learners to develop understandings. (Courtesy of Madison, Wisconsin, Public Schools.)

"shuttle," "shears," and a host of other new symbols with which he may or may not have associated understandings, he may become more bewildered than challenged.

At this point he must have opportunities for additional real experience or perception. A visit to a farm to watch sheep being sheared or to a factory in which woolen things are fabricated would be valuable. Someone from the community might be invited to the classroom to demonstrate the hand carding, spinning, and weaving of wool, and at the same time answer questions the children ask. A museum might be visited.

The child whose curiosity has been aroused will respond enthusiastically to perceptual experiences. In this case additional experiences with wool will help him achieve varied understandings of the processes involved with wool and will allow him to draw conclusions as the result of his continued thinking about wool. If children do not get the new experience that is needed, incomplete or half learning will result.

Usually the difficulties of thinking and problem solving mount as the nature of the problem to be solved concerns things that are increasingly remote from opportunities for first-hand experiencing. The middle-grade child who is trying to gain an understanding of life in some remote area of the world is faced with greater barriers than is the child who wants to know more about plant life in the family garden.

Consider the learning problem of the child who attempts to understand life on the desert. He is told that people who live in desert countries live in "barren areas." He may be asked to describe "a sandstorm."

What understandings does the child who lives in our Middle West have which will help him to describe a desert sandstorm? His immediate perceptions may include the sensation of a grain of sand in his eye. A trip to the beach may have acquainted him with the feeling of sand on his arms and legs. He may have experienced high wind. Yet these dissociated experiences may not parallel very closely the sensations he would have if he were in the rocky, barren south slopes of the Atlas Mountains standing in the swirling, dry topsoil which infiltrates everything as a seventy-mile-an-hour wind whips relentlessly across the surface of the land.

The thinking teacher will sense the child's need for further experiential backgrounds. Obviously the most effective thing would be to transport the children to the desert, to the south slopes of the Atlas range. This, of course, is impossible. The next best thing is to contrive experiences. A feeling for the locale might be achieved through the construction of a model. Carefully selected photographs, both black and white and colored, would help as they were examined and discussed. An authentic sound motion-picture document about life in this desert region would add understanding. By contriving visual and auditory impressions of environmental situations it is possible to supply "real" or concrete experiences upon whose basis a more accurate understanding may be gained of life in an open desert. *Out of these understandings, the sorting, associating, discarding processes of thinking may then proceed.* The process may be visualized as in Fig. 2.6.

The orderly process of thinking involves the selection of those understandings which apply, and the discarding of those which do not apply, in the solution of a problem. The basis for thinking is a body of understandings from among which selection may be made. Understandings are the outcomes of perceptual or real experiences with events or things. Thus the basis for thinking is a broad background of perceptual experiences.

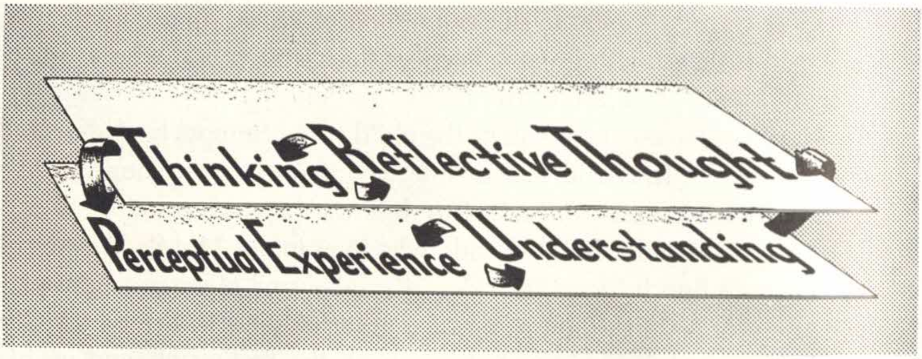

Fig. 2.6. Understandings become the basis for thinking.

In a complex world environment where the learner is often unable to have had a wide range of personal perceptual experience, audio-visual materials may be useful in simulating many desirable and needed perceptual experiences.

PERCEPTION—BASIS OF ATTITUDE FORMATION

What is an attitude?

Many descriptions of attitudes might be quoted. One which serves our purpose well has been voiced by Gordon W. Allport: "An attitude is a mental and neural state of readiness, organized through experience, exerting a directive or dynamic influence upon the individual's response to all objects and situations with which it is related."[6]

How may this definition be applied to the problem of how children form attitudes toward frontiersmen or pioneers? Attitude formation may start during conversations around the dinner table as children listen to parental views. A scoffing remark about the Thanksgiving Day celebration may lastingly influence one's regard for pioneers. The feelings the parent expresses as he speaks about Thanksgiving and the pioneers may later arouse or deaden the child's desire to investigate American history. A child's awareness of the idea of "frontiersmen" or "pioneers" may spring from purely emotional experience gained in home conversations about the subject.

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[6] Gordon W. Allport, "Attitudes," *A Handbook of Social Psychology,* Clark University Press, Worcester, 1935, p. 810.

At school, on the other hand, "the pioneer idea" will most likely be studied in connection with concrete and verbal experience. During this study, meanings, associations, and the attitude ultimately adopted may change drastically.

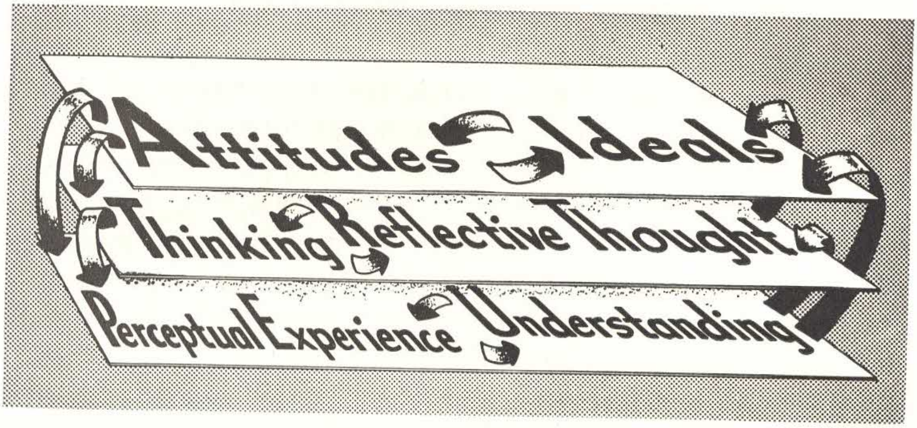

Fig. 2.7. Reflective thinking rather than emotion is a more hopeful basis for the attitudes we develop.

Classroom study situations can create understandings about pioneer life through realistic and concrete experiences. Concrete experiences may include models of pioneer villages, and trips to the museum to examine pioneer home construction, costumes, utensils, and other things related to frontier living. A well-planned bulletin board with illustrations can help visualize pioneer life. A motion-picture film can reveal a reconstructed frontier village complete with people who talk in the pioneer way of speaking. These added experiences and understandings can alter a pupil's original attitude or create an entirely new one.

On the basis of such learning opportunities, a pupil can compare life today with frontier living a century ago. The understandings he selects from his experience, and the associations he builds in attempting to understand living conditions *then* and *now* will ultimately modify his whole "feel" or attitude toward the pioneers who opened the West. The child of today may gradually begin to associate the life of the pioneer with democratic purposes. Attitudes based on imitation or emotion give way to those which the learner himself forms on the basis of his new concrete experiences, understandings, and thinking.

The diagrammatic representation in Fig. 2.7 shows the multidirectional relationship between attitudes, thinking, recalled perception, and concrete experiential backgrounds. Although the diagram shows three levels —perceptual, thinking, and attitudinal development—all are endlessly intermeshed and interrelated.

THE INTERRELATED PROCESSES IN LEARNING

As a young learner attacks a problem through thinking, he may be influenced by an attitude of mind that is well established if only on an emotional basis. He will probably begin to search for additional understandings. He may gain these through interviews, through reading, through discussion, or through concrete experiencing. If he is an orderly thinker, he will then select the data that fit his purpose and apply them in the solution of his problem.

Members of a junior-high-school class were asked at the beginning of a unit of work to express their feelings toward colored people. The most predominant attitude revealed that most of the children felt very superior to these people. When they were asked to describe colored people, their responses included such words as "not too bright," "entertainers," "servants." Most of the students described the colored person in terms of a stereotype.

Following additional discussion, the group admitted that it needed more information. Books were consulted, biographical accounts about famous colored people were read, two filmstrips[7] were selected which visualized the similarities and dissimilarities among the peoples of the world, and several carefully selected sound films[8] were shown which transported the audience into parts of the world where colored people lived.

The stereotype idea was soon exploded. Even casual examination of the film material revealed startling anthropological differences among colored people.

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[7] *We Are All Brothers,* 54 frames, Silent, B&W, Public Affairs Committee; *Man, One Family,* 57 frames, Silent, B&W, Film Publishers, Inc.

[8] *Watussi of Africa,* Sound, B&W, 11 min., Encyclopædia Britannica Films; *Pygmies of Africa,* Sound, B&W, 17 min., EB Films; *The Mangbetu,* Sound, B&W, 10 min., EB Films.

Photographs of Negro architecture were studied. Specimens of handcraft, sculpture, carving, and art were examined. Students who previously had been very dogmatic in their assertions showed evidences of doubt about some previously held beliefs. Carefully planned classroom procedure had begun to modify the imitated or emotional attitudes of the students.

In another situation a group of tenth-grade pupils studying economic geography expressed great surprise when told that the highest per capita development of hydroelectric power was not in the United States but in Switzerland. The preconceived attitude that Americans are superior was so firmly ingrained in the minds of this group that actually seeing a sound motion-picture film[9] which showed many electric ranges, electric lights, and radios even in the most remote Swiss chalets *was not sufficient to alter this original attitude in many of the students.* Further discussion, further reading, further reference to simulated experiences were required to alter the prejudice of the group.

In another group of upper-intermediate-grade children the attitude that people who live far away must therefore be very unlike them was held so completely that they at first failed to accept some of the obvious similarities which exist. During a study of the people of Chile, the similarities between the San Joaquin valley of California and the fertile central valley of Chile were being discussed. Even in the face of this, these twelve- and thirteen-year-old children held a persisting attitude of "foreignness" toward Chileans. After having seen a 16 mm. sound film which showed women in Chilean households preparing the noon meal and cutting vegetables such as carrots, peas, beans, and others familiar to every class member, most of the group were unable to identify the vegetables. To them the obvious was "too simple." It just could not be that people who lived 4000 miles away cultivated and ate some of the same vegetables that are raised in the United States. However, further discussion and additional showings of the film dispelled the false impressions.

In the classroom the teacher has an opportunity to approach the problem of modifying, influencing, and actually building socially desirable attitudes. That this can be accomplished through carefully planned learning situations has been brought out. Attitudes can be formed or at least modified. By supplying positive and graphic opportunities for understanding, a reservoir of readiness can be established. This background of "learned" understandings may allow for thoughtful sorting, arranging, and testing. Thus real "experience" is perhaps the classroom's most hopeful avenue through which we can help influence children as they think their way toward socially desirable attitudes and patterns of future action. Through these carefully planned classroom learning opportunities we can more effectively provide students with materials for discriminating thinking when they deal with the problems of living and acting in both the present and the future.

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[9] *Children of Switzerland,* Sound, B&W, 11 min., EBF.

This becomes the high social purpose of education.

Effective instructional techniques depend greatly upon providing young learners with wide varieties of participatory experiences. When children begin their school life they have the opportunity of examining the world about them through direct observation. They may take field trips in the community. They may visit the water plant, the post office, the corner grocery store. They may engage in conversation with the people who operate local industries. All this very effective learning is accomplished through seeing, hearing, feeling, manipulating, and examining. It is nature's own way of learning—by seeing and hearing simultaneously, by becoming "aware" through the interdependent functioning of these two primary sensory receptor mechanisms, the eye and the ear. Through concrete, first-hand impressions young children become familiar with the world about them.

UNDERSTANDING IN READING

We soon recognize that among average children in the first grade those who have many first-hand experiences often make most progress in learning to read. As these first-graders begin to read, they read about things they have experienced. The words they see soon become associated with these experiences. The child discovers he is able to gain comprehension in reading because he associates more and more experiences with the symbols which stand for them.

But what happens when, in the upper grades, we leave our community, our homes, our neighbors? What happens to the close relationships we have heretofore held? What happens to our learning experiences when we study about things, places, locations, and climes which may be thousands of miles away or which for one reason or another may be inaccessible to our direct audio-visual experiencing?

We know very well what happens. Learning efficiency declines because no longer are we able to be the first-hand "see-ers," "doers," "listeners."

How can we be sure that the written word brings us the exact idea that the author had in mind, the author who has been there, the author who has seen for himself? Children seldom have had the experiences about which an author writes. Often the author's words may set the child to thinking about some altogether different experience from what the author meant to report. Frequently a given word becomes associated with what the adult calls a "wrong" experience. Out of these circumstances we see the poor reader emerge, the child who is content to sit in the corner and remain silent.

The first-grade child who reported that her younger sister was "double years old" related her own "twice as much" understanding of the word "double" to the fact that her one-year-old sister had passed her second birthday.

The child in the urban community who reported that she reached adolescence before discovering through first-hand experience that a cow was bigger than a mouse had read the story of dairying in complete absence of anything but literal understanding of the cow-and-stanchion photograph in her second-grade reader.

The third-grader who paused in bewilderment over the meaning of the story about the boy on the bicycle who always rode "ahead" applied only his literal understanding of the word "head." Little wonder that he saw difficulty in riding a bicycle and a "head" at the same time.

Often in the transition from the storybook, fairy-tale literature of the pre-primary and primary level, children find difficulty in accepting the reality of things they read about in upper-grade books. Reading material about people and events in remote places is often only partially understood because the child has had little or no concrete experience from which to gain an understanding of the words he meets.

A boy in the fifth grade, after reading a chapter on the pygmies in Africa, in all seriousness questioned the real existence of such places, things, and, most important, people. His earnest question, "Are they like fairies?" revealed his skepticism.

A junior-high-school child returning from a trip east hesitatingly admitted a feeling of disappointment when, on entering what her geography book had described as "heavily industrialized New England," she passed instead through vast stands of virgin timber and mountain terrain. When asked what she had expected, she replied, "I had read about the heavily industrialized New England states. Industry means factories, and I didn't see any."

This girl expected some great change representing industrialization to occur the moment the car in which she was riding crossed a state line. Similar misinterpretations arise in attempts to understand such common phrases as "famous for citrus fruits," "famous for textiles," etc.

To vocalize the sounds of the printed word symbol without associating a meaning to that symbol is pure verbalism. To pursue reading *per se* in the absence of wide readiness experience in the first grade, junior high, or high school is the academic crime of verbalism—verbalism which refers to reading as a mechanical thing without understanding. *Children and young people who read must first have wide opportunities for the direct experiencing or contrived experiencing of those things, events, processes, or ideas to which the printed symbols refer. It is only on the basis of experiencing that the printed symbol can take on comprehension or understanding.*

The meaning of the printed word is almost always associated with previously gained understandings, most of them concrete. *Just as the primary teacher acknowledges that before the word must come the idea, so in all aspects of learning, upper grades and high school, each teacher must assume the responsibility for being sure that the background experiences which underlie the comprehension of the printed word are provided to the conscious experiencing and understanding of the student.* This is as true of a second-grade social studies pupil as it is of the college freshman enrolled in biology, mathematics, or the social history of the United States.

EXPERIENCE AND CREATIVE EXPRESSION

Children of relatively equal intelligence will vary in their enthusiasm for entering into a conversation, making a report, or participating in recitations very largely in terms of the ideas they have. The child who comes from a home where the family conversation includes him, where good books are available, where vacation trips are often taken, will have a decided advantage over the child that does not have these opportunities.

An art teacher in a large midwestern city was asked what relationship she thought existed between experiential background and artistic expression. Her reply indicated that, according to her observations of children's ability and art, she was convinced that there was no such thing as creativeness *per se,* but rather that the child who had wide experience with things likewise had lots of ideas to put down on paper. Similar observations have been made concerning written composition. The child who has had much experience with things and events usually is not at a loss for a subject about which to write, whereas the reverse is true of the child who has not had the advantage of wide experiencing.

OVERCOMING SOME BARRIERS TO TEACHING

Teachers in the modern school create innumerable situations for realistically bringing an understanding of the world to children. But ask any teacher the question, "Are you satisfied with what you are doing?" and she will say, "Yes—reasonably so—there are many things that I know I should be doing, but I cannot for one reason or another."

Upon pressing this point the conversation may proceed like this: "I can't do much about taking my children to 'faraway places.' Reading is too often the only medium through which I can give the children experience with the cultures, peoples, vocations, and home life of other lands. Many times I realize that no child can attach real meaning to this verbal experience—he hasn't really seen, really known these people; the words are, well, just so many words. The child who has never seen the home of an Indian farmer in the Punjab, the child who has never been in the home of a Greek farm family on the barren slopes near Athens, the children who have never lived on the south slopes of the Atlas Mountains—well, how can they know? Often I say I wish I could do something about this, but I realize that it is relatively impossible, so I just make the best of it and do the best I can."

A little way down the corridor another interview reveals a similar feeling of inadequacy: "It's like this. In the spring we begin talking about the growth of plants or about the life cycle of insects. We want to learn just how all this happens, but we can't watch things grow. It happens too slowly. Suppose that in the window box over there we planted a seed. In order to watch that seed actually grow we might have to say, 'Johnny, you take the 12 to 1 o'clock shift; Mary, you take the 1 to 2 o'clock shift; Betty, you take the 2 to 3 o'clock shift, etc., around the twenty-four hours.' Now that would be impractical if not impossible. If we want to watch the butterfly as it emerges from its cocoon, we'd have to post a twenty-four-hour watch in our classroom so that someone would always be there to sound the alarm when at last that marvelous event, the 'breaking out,' occurs. Oh, there are many things in science that we can talk about. If there were only some way to see them all happen. But I guess that is one of those impossible things. We'll just have to do the best we can."

And later on in the high school, an interview with the history teacher goes something like this: "Every time we work at the unit on westward expansion we talk about covered wagons, sod houses, and Sutter's Mill. We speak of such terms as 'privation,' 'frontier spirit,' 'hardship,' 'individualism.' I can see the puzzled frowns cross the brows of my students, and I say to myself, 'If I could only turn back the clock. If I could only take these students *to see the things we are talking about.*' But we can't, so we make the best of the job by turning to the pages of our textbook, by looking at the crude woodcuts and the line drawings which adorn the pages. If only we could have real, living, background experiences of our own. If only we could know the actual experiences that these pioneers had. What a way *that* would be to study history!"

Later the home economics teacher reports: "Too often I feel that we are just mixing ingredients. We put in so much of this and so much of that, set the oven at the proper temperature, and presto, out comes the finished product. For most of the youngsters, that is all right. It's just do this, do that, and you get the results. But more and more youngsters are becoming curious. They want to know *how* this happens. I do the best I can by explaining about the leavening processes, about the action of shortenings on the tiny granules of starch, but something seems to be lacking. I can't always be sure that the thing I see in my own mind is being understood by the children. I guess there isn't too much I can do."

All these traditional barriers to complete experiential learning have long been recognized. There are beginnings that any teacher can make regardless of the classroom situation in which he finds himself. He can examine the use he makes of the blackboard. He can investigate the community for field trip possibilities. He can start making his own file of mounted pictures, and pay more attention to the bulletin boards he arranges.

But today, among the many things which are credited to the genius of twentieth-century man, a new science of education is emerging—the science of visual education. It is the means by which the experiences of the world, regardless of whether they existed in the past, are apt to exist in the future, or exist in some remote portion of the planet, can be brought into any classroom in any community. Through the medium of the filmstrip, the motion picture, the transcription, the radio, television, and the slide—through the teacher's opportunity to handle creative activities in any of these media, our schools are blessed with a situation in which, in addition to clever use of the blackboard, bulletin board displays, creation of effective models, well-planned field trips, the outcomes of a modern technology can be included. Today through filmstrips, transcriptions, films, maps, charts, and globes we can investigate the outlying reaches of our physical world. The physical environment, whether it be "too big," "too small," "too fast," or "too slow," can be captured for study and restudy. Knowledge about the world can be made available to the smallest class in the most remote school in the country at the exact moment of need—all at the click of a switch.

The youth who come to our schools today are living in a world in which all the people share in the problems of survival. They must know not only what Pumpkin Hollow raises as its chief products but that new air terminals have been built in central China. They must know why automatic voting machines are being adopted and why children in some lands are starving and in need of educational opportunities similar to those that are guaranteed to all the children in the United States. They must know that in India the untouchable caste has been legislated out of existence and that now at least a minimal public education is provided for all the children. Most important, today's youth must understand the implications of all these circumstances and events as they apply to the world they will enter as adults. Upon their shoulders the responsibilities of tomorrow will fall.

The modern school plant has become the place in which pupils learn, experience, prepare for, and understand their place in tomorrow's world. The school must reveal the living world of today if it is to help build the kind of civilization we wish to guarantee for tomorrow.

It is the purpose of succeeding chapters in this book to investigate the degree to which the traditional and current problems of education can be made more graphic, more effective, more vivid, more meaningful, more likely to become an integral part of building the attitudes which the children of today must have if they are to function effectively in the complex, unknown world of tomorrow.

SUMMARY

Our immediate and expanded environment is the result of our ability to perceive. Our understanding of events, places, and objects is a direct outgrowth of our ability to perceive. Our perception of things depends on our ability to see, hear, touch, taste, and smell.

As individuals we gain an understanding of our surroundings through the interplay or interrelationship of our own sensory perceptor organisms.

The basis of all understanding, thinking, and attitude formation is real experience. In a world which is daily becoming more complex because of the growing interrelationships of man, the child in school needs to know more about his entire environment. Because in this complex world the learner is unable to have the wide range of first-hand or real experiencing, the problem of the teacher becomes more complicated.

The responsibility for providing first-hand experiences out of which understanding may occur affects many areas of the curriculum.

Other things being equal, the child who is a good reader will succeed in terms of his readiness or background experiences. On the basis of many and wide experiences he will be able to associate meanings with the words which symbolize or "stand for" these experiences.

The child who is asked to express himself through the medium of art, drawing, oral or written communication, etc., needs to have many first-hand background experiences. The child who has many of these experiences is more likely to succeed in creative expression because he has many understandings based on perception from which to draw his creative ideas.

In our schools we are investigating a complex physical and social environment characterized by phenomena which are too big, too small, too fast, or too slow to be captured for classroom study. Frequently distances interfere with first-hand experiencing. In this kind of complex world the role of contrived experiences becomes very important to classroom procedure.

Suggested Activities

1. Select a description of some little-known object from an encyclopedia. Read it to your classmates. Ask them to "rough sketch" their visualization of this description. Examine the sketches for evidences of differing background experiences.
2. Make a classroom collection of stories, incidents, or quotations which reveal that "how and what we think often depends on the experiences we have, or have not had." Collect examples like:
   a. "The Chinese delegate to the United Nations was confronted by a reporter who asked:

      'What strikes you as one of the oddest things about Americans?'

      After a moment the Chinese delegate replied: 'The peculiar slant of their eyes!' "

   b. Overheard as the young child prayed—"Give us this day our jelly bread. And lead us not into Penn Station . . ."

   c. The teacher was telling the story, "The Jackal and the Alligator." She paused and almost as an afterthought asked: "You all know what an alligator is?"

      "Oh yes," answered the small boy, "it's one of those things you ride up and down on."
3. Examine the learning objectives listed in a typical unit of work in a course of study of a subject area in which you are interested. As an alternative, analyze some of the study questions at the end of a typical chapter from a textbook in the subject in which you are interested. State the background perceptual experiences a learner must have in order to respond intelligently to the activity in question.
4. In the preceding exercise, what classroom teaching techniques are implied in providing the experiences this same learner will have to have?
5. Interview a primary-grade reading teacher, and ask the following questions:
   a. What readiness activities do you help children engage in before attempting beginning reading?

   b. What is the relationship of readiness activity to success in reading?

   c. Do home backgrounds (presence of good books in the home, family travel, family group conversation) reflect in children's reading success?

   Report your interview to your classmates. What conclusions do you have?

   Conduct similar interviews with teachers of art, social studies, etc. Formulate similar but appropriate questions for your interviews.

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3. The Chalkboard

The civics class was dismissed. The principal moved forward to discuss his observations with the teacher.

"A fine lesson, Miss Jones," he said and, after a pause, "As you were explaining the organization of the Supreme Court, it occurred to me that a diagram on the chalkboard might have helped."

Miss Jones considered this a moment. "You're right—and the same thing could have been done to explain the cabinet functions. But I feel so helpless when I attempt to use the chalkboard. I guess I'm not—well —just not artistic."

For hundreds of years the chalkboard has been a basic technique of instruction. All during this time, teachers have been using the chalkboard with varying degrees of success. Too often they have shunned its use because they have felt as Miss Jones did. This need not be the case. It is the purpose of this chapter to describe chalkboard techniques which are easily and effectively used and which are within the ability of any teacher interested in improving instruction through good chalkboard utilization.

AN ESSENTIAL TOOL OF INSTRUCTION

In today's museums, the slates which served as chalkboards in colonial schools remind us that chalk, eraser, and chalkboard surfaces have for centuries helped children to learn.

The modern version of the old blackboard has a variety of forms. It varies from the smooth flat surface of quarried slate in older schools to the pastel-shaded, dull-surface chalkboard areas which fit beautifully into the general decorative scheme of the modern classroom. Between these extremes are the dull-finish, paint-coated surface of wood or composition board, the etched plastic surface, and the mossy-finish glass panel.

An authoritative description of the modern chalkboard appears in the *Guide for Planning School Plants:* "New demands for light reflection in the classroom and avoidance of dark areas are being successfully met by the new light-colored chalkboards. The best of them give good visibility, are durable, and contribute to the attractiveness and eye comfort of the classroom. Such light chalkboards should replace blackboard. Sixteen to twenty lineal feet of chalkboard is generally sufficient for an elementary classroom."[1]

In classroom situations demanding specialized use of the chalkboard, adjustments in terms of size, position in relationship to viewers, and other considerations call for special installations. Regardless, however, of the many forms in which it appears in the present-day schoolroom, the chalkboard continues to be an integral part of the classroom environment.

In the well-designed modern classroom the pastel-colored chalkboard, ranging in tone from yellow to green, may be described in terms of its physical characteristics:

1. An effective chalkboard provides maximum contrast between background and line drawing or printed symbol.
2. An effective chalkboard eliminates glare. This was a common problem of the traditional, smooth-ground blackboard surface.
3. An effective chalkboard is colored to blend with the interior room decoration and create a restful atmosphere. At the same time it must be efficient in terms of visual characteristics. Chalkboards are usually pastel green, yellow, or black.
4. An effective chalkboard is mounted so as to be within easy arm's reach of the pupils. The mounting will vary, depending on the age group using the chalkboard.

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[1] National Council on Schoolhouse Construction, *Guide for Planning School Plants,* Nashville, 1949, p. 44.

TECHNIQUES FOR USING THE CHALKBOARD

A basic understanding of lettering, of preparing the chalk, of executing simple line drawings, and of creating more complex visualizations by means of the special chalkboard techniques about to be described should give any teacher reasonable facility in creating myriad chalkboard study opportunities for the children who work under his guidance.

SELECTING THE CHALKBOARD SPACE

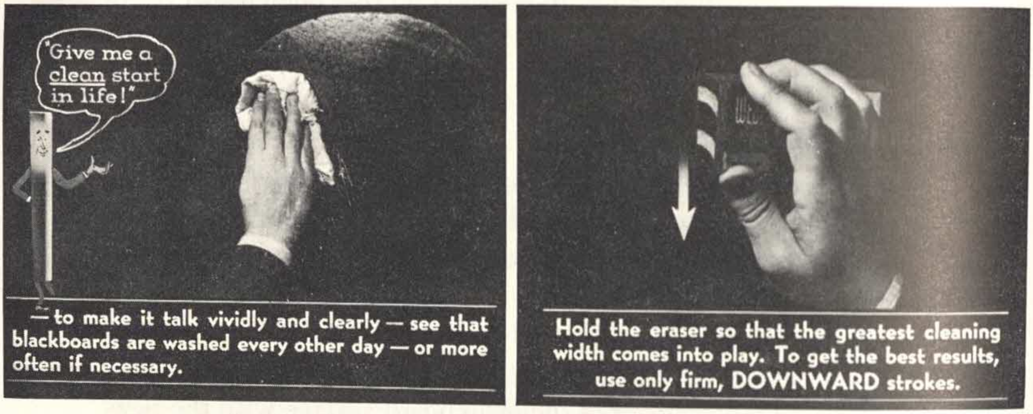
Choose a section of the chalkboard which can be easily seen by all the children. The angle from which the children view the chalkboard must not be too acute; they should have as "front-on" a view as possible. In all cases, portions of the blackboard which reflect a glare of light entering from windows or artificial sources should be located; the situation should be corrected by means of sun curtains, changes in seating, additional artificial lighting, or replacement of the chalkboard surface with the new glareproof material. Use the following simple test in choosing the best chalkboard space:

Write a few words or draw a simple sketch on each chalkboard panel. This may seem repetitious, but it is practical and worth while. Walk around the room and view the entire chalkboard space from at least five key positions in the seating area. The presence of glare caused by unfortunate angles of light and seating will be apparent. Today, fortunately, most chalkboards are relatively free of glare, but in classrooms that have the old smooth-surface types it will be necessary to consider glare and seating.

On the basis of your test, determine the space on which the words and drawings are completely and comfortably visible.

PREPARING MATERIALS

The chalkboard should be thoroughly clean. Before using a panel of the board, all excess chalk powder and smudgy surface dust should be removed. Erasers should be cleaned regularly, as should the chalk trough. A uniform downward stroke of the eraser is an effective way to remove old drawings and lettering; avoid a scrubbing or irregular motion. The type of erasure may seem inconsequential, but experimentation will show that greater legibility can be attained on a surface on which uniform downward strokes have been used. (See Fig. 3.1.)

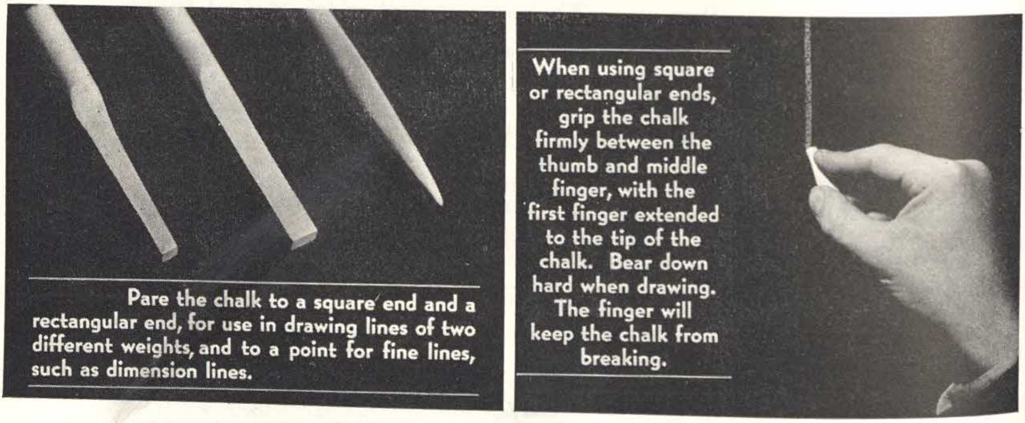


—to make it talk vividly and clearly—see that blackboards are washed every other day—or more often if necessary.

Hold the eraser so that the greatest cleaning width comes into play. To get the best results, use only firm, DOWNWARD strokes.

Fig. 3.1. (This and Figs. 3.2 and 3.3 courtesy of The Jam Handy Organization.)

The chalk should be prepared for the various uses to which it is put. Just as pencils are sharpened to flat broad points, sharp points, or blunt rounded ends, so should full-length pieces of chalk be prepared for specific tasks (Fig. 3.2). For harsh outline work the chalk should first be scraped over coarse sandpaper to produce a blunt-angle end surface. For detail shading or faint guide lines the chalk should be sharpened to half its original diameter. For shading, grasp the chalk so as to bring the longest surface against the chalkboard. Use chalk which is neither crumbly nor extremely hard. Use a large piece of chalk. The last "pinpoint remains" of the chalk should be discarded.

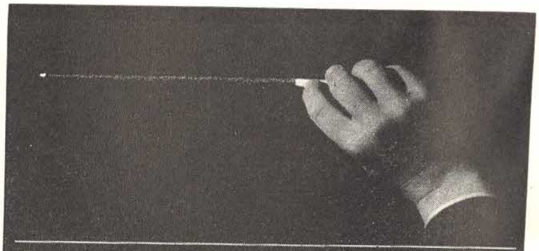


Pare the chalk to a square end and a rectangular end, for use in drawing lines of two different weights, and to a point for fine lines, such as dimension lines.

When using square or rectangular ends, grip the chalk firmly between the thumb and middle finger, with the first finger extended to the tip of the chalk. Bear down hard when drawing. The finger will keep the chalk from breaking.

Fig. 3.2.

HANDLING THE CHALK



To draw a freehand straight line on a blackboard, first locate the two points. Place the chalk on the first point. **KEEP THE EYE ON THE SECOND POINT**— and draw the line.

Fig. 3.3

In the primary and intermediate grades, regular amounts of time are spent in penmanship and the correct manner of handling pencils, pen, and ink. Similarly some time should be spent in learning to handle chalk, for there is a correct way of using it. A few practice strokes will help you to become an effective user.

As you experiment with the chalk, observe the proper way of drawing a straight line (Fig. 3.3) and a circle. For good visibility, be sure to draw lines as wide as the chalk permits.

Just as the art teacher assembles and learns the use of brushes, paints, and easel, so you also may become a more effective chalkboard user by providing yourself with chalkboard rulers, compasses, templates, stencils, and similar tools, and learning how to use them.

LETTERING

Chalkboard lettering may with reasonable practice involve no more than the mastery of certain basic line-drawing techniques. Good lettering techniques can be used by all teachers.

The most expert draftsman would not think of proceeding until he has laid out a general plan of work. Block out with thin guide lines the space needed for the lettering. The use of guide lines enables the lettering to be of uniform size and large enough so it can be easily read by a child seated at the rear of the classroom. Letters should not be less than 2½ inches in height if they are to be visible from the rear seats in the usual 30-foot-deep classroom.

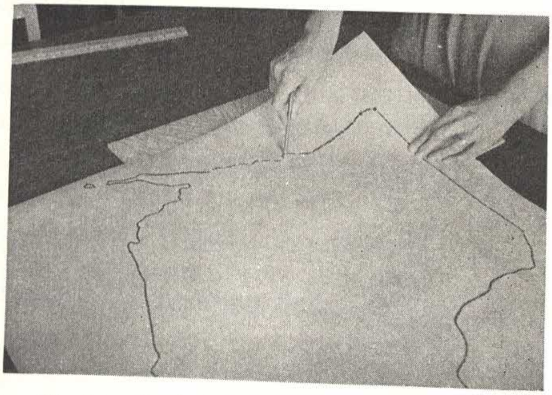


Fig. 3.4. Punch the holes about an inch apart. (This and Figs. 3.5–3.8 Wittich and Felton photographs.)

Other things being equal, printing is more legible than cursive writing. Although many people think that cursive writing is much more rapid than

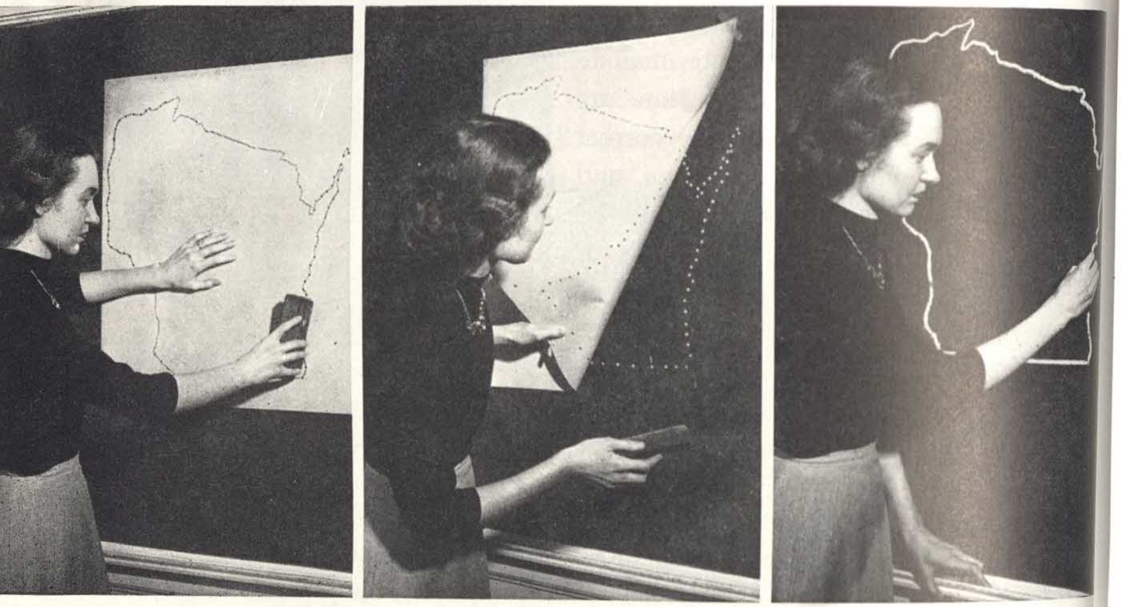


Fig. 3.5. *Left:* Hold the pattern firm. *Center:* Check the outline before removing the pattern. *Right:* Connect the dotted outline.

printing, reasonable practice with simple block letters will result in amazing speed in printing. Do not forget that although the letters may appear unusually large to the person who is writing them, an occasional walk to the rear of the seating area will show that they are not too large.

Use enough space on the chalkboard. Do not cramp or squeeze into restricted space material that would be better spread out. Leave a blank space between letters; this will dramatize the drawing or lettering. The classroom teacher will do well to imitate the modern trend in magazine advertising layout which relies on the planned use of blank space as an attention-getting device. A few carefully selected words, dramatically phrased, are more effective than crowded, wordy descriptions.

THE PATTERN METHOD

The chalk pattern technique adapts itself with great efficiency to basic visualizations which are needed frequently. The mathematics teacher who is confronted again and again with the need to explain line graphs, the music teacher who wants to illustrate note reading techniques, the geometry teacher who needs to use repeatedly various types of triangles, rectangles, and parallelograms; the science teacher who uses certain types of apparatus such as thistle tubes or funnels in his blackboard illustrations; and the social studies teacher who refers constantly to outline maps of county, state, or continent find the pattern technique of great assistance. The pattern method is sometimes called the punch or pounce system.

Suppose that an intermediate-grade teacher finds that she frequently refers to an outline map of her state. Therefore she wants to devise some means of quickly creating this map on the chalkboard. She is not content with guesswork or with the wobbly map that results from freehand sketching. As the first step she carefully draws the outline of the state on a piece of heavy tracing paper. Then, with a leather-worker's punch 1/8 or 3/16 inch in diameter she perforates the outline at approximately one-inch intervals, or closer if the detail of the contours is more complex (Fig. 3.4). Experimentation will indicate how close the holes should be. The distance may vary from a quarter inch to one inch, depending on the nature of the drawing.

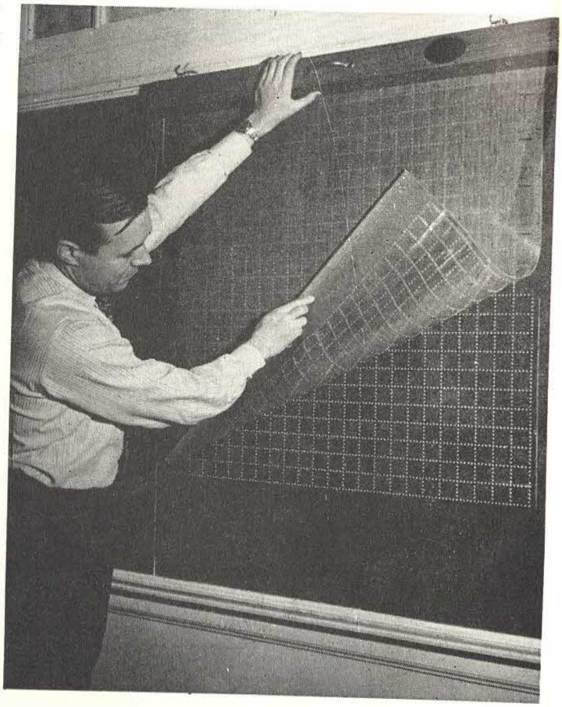


Fig. 3.6. Frequently used patterns can be mounted on rollers and suspended from the top of the chalkboard.

When the complete drawing has been "punched out," the teacher holds the pattern against the chalkboard and rubs a dusty eraser firmly across the perforated section of the outline. (Note: The eraser should be rubbed back and forth across the perforations, not patted.) Thus an outline of chalk dots appears where the perforations in the pattern were. She then connects the dots, freehand, with chalk. The entire procedure is shown in Fig. 3.5.

Patterns that are used repeatedly may be mounted on window-shade rollers and filed in an orderly way. They are thus available for use at a moment's notice and they can be suspended easily from hooks along the top of the chalkboard rail (Fig. 3.6). (Commercial patterns are now available[2] for such subject areas as mathematics and geography.)

THE TEMPLATE METHOD

Repeatedly used symbols, designs, and diagrams can likewise be easily reproduced on the chalkboard by means of templates. A template is a pattern; it may be made of sheet metal, heavy cardboard, or plywood. Such material cut into the shape of beakers, triangles, parallelograms, circles, etc., may be held against the chalkboard and its outline drawn in with chalk. Templates may be made in the school or home shop, or they may be purchased commercially at small cost.[3]

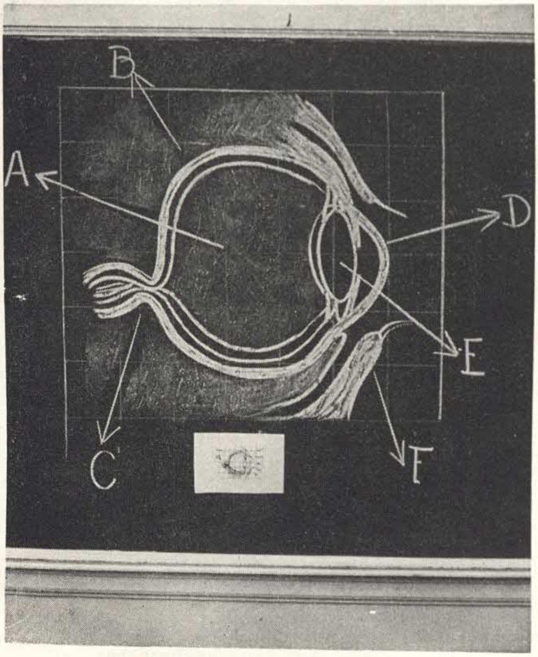


Fig. 3.7. The grid method can be used to enlarge a small diagram easily.

THE GRID METHOD

The grid technique for chalkboard illustrations is within the grasp of every teacher. The illustration or original drawing may be of any ordinary size of paper, from 3 by 5 inches to 8½ by 11 inches. It is blocked off into squares, which can be ½ or ¾ of an inch, 1 inch, or even larger. Smaller squares are necessary if the original has much detail. The less complex the drawing, the larger the squares may be. The chalkboard is marked off in larger squares. In transferring the drawing to the chalkboard, the teacher duplicates the original, one square at a time, on the chalkboard (Fig. 3.7). The grid technique is amazingly rapid. A few repetitions of it will give the teacher a surprising degree of facility in its use.

THE PROJECTION METHOD

The opaque projection technique of creating chalkboard illustrations and diagrams is easily and effectively used today because of the development of more brilliant illumination in opaque projection equipment. With this startlingly simple technique, the opaque material need only be focused upon the chalkboard surface in whatever size or dimension is desired. The outlines and other characteristics of the projected pattern may then be traced in any color and in any detail. The opaque projection technique lends itself admirably to pupil participation in the preparation of blackboard illustrations which then become illustrative parts of reports or demonstration displays.

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[2] Corbett Blackboard Stencils, 548 Third Ave., North Pelham, N.Y.

[3] Teaching Materials Service, 915 North Ave., Beloit, Wis.

THE HIDDEN DRAWING METHOD

The hidden drawing chalkboard technique is a unique way of coördinating demonstration and explanation, by either pupil or teacher, in practically any subject area. By preparing in advance a series of sequential or developmental illustrations, the teacher can describe and expose one stage or illustration at a time. In this way, attention is focused on the explanation that accompanies the exposed drawing. By using the hidden drawing technique, the teacher preserves the sequentialness of the situation, since of necessity all eyes are on the chalkboard. Stretching a wire along the top of the chalkboard and draping inexpensive cloth from this wire (see Fig. 3.8) make the hidden drawing technique a reality in any classroom.

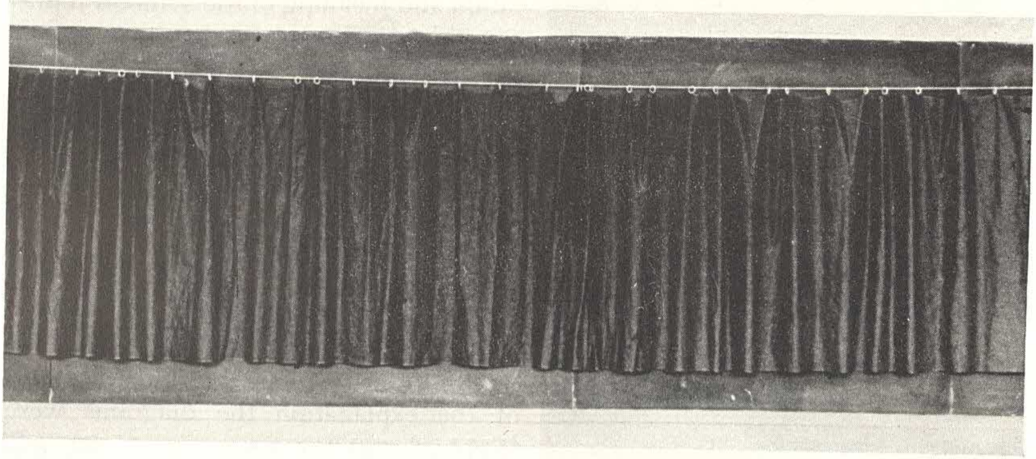

Fig. 3.8. A wire and drapery material adapt the chalkboard for the hidden drawing technique.

This technique was used by a biology teacher who wished to explain the food-getting habits of the amoeba (see Fig. 3.9). Before the class

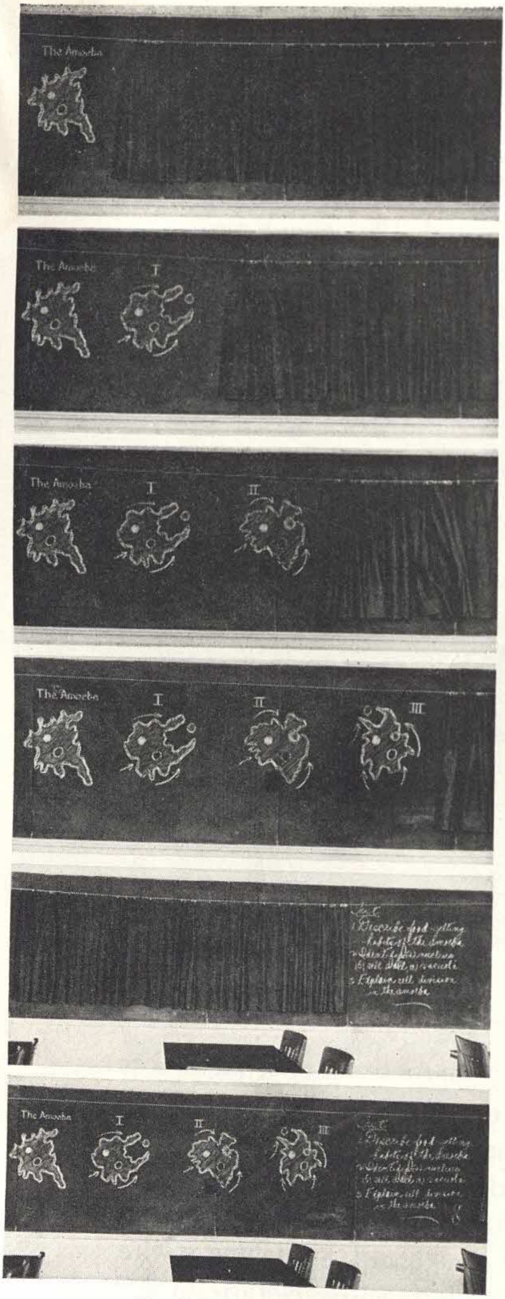

Fig. 3.9. Chalkboard diagrams are revealed as they are needed during the learning process.

convened, four carefully worked-out drawings were put on the chalkboard. When the class entered the room the chalkboard surface was completely hidden by the wire-strung green cotton curtain.

When the teacher announced the subject of the lesson, "Food-Getting Habits of the Amoeba," he drew aside enough of the curtain to reveal the outline diagram illustrating the structure of the amoeba. The contours of the cell wall, and the location and meaning of the symbols representing the nucleus and the food vacuole were discussed.

The first stage of the food-getting activity was next described as the instructor moved the curtain farther to the right and revealed the second drawing.

As the discussion continued, additional stages in the amoeba's adaptation for food getting were disclosed by moving the curtain progressively to the right. At the end of the explanation the diagrams were "hidden" and the prearranged test was exposed.

As the final activity, the entire curtain was moved to one side, and the class discussed individual pupil self-analysis as revealed through the understanding of the various relationships of the amoeba and its food-getting activity.

THE COMIC APPROACH

In this day of graphic news and magazine illustrations, both pupils and teachers are well acquainted with cartoon techniques. Examination of popular cartoons will reveal that not all

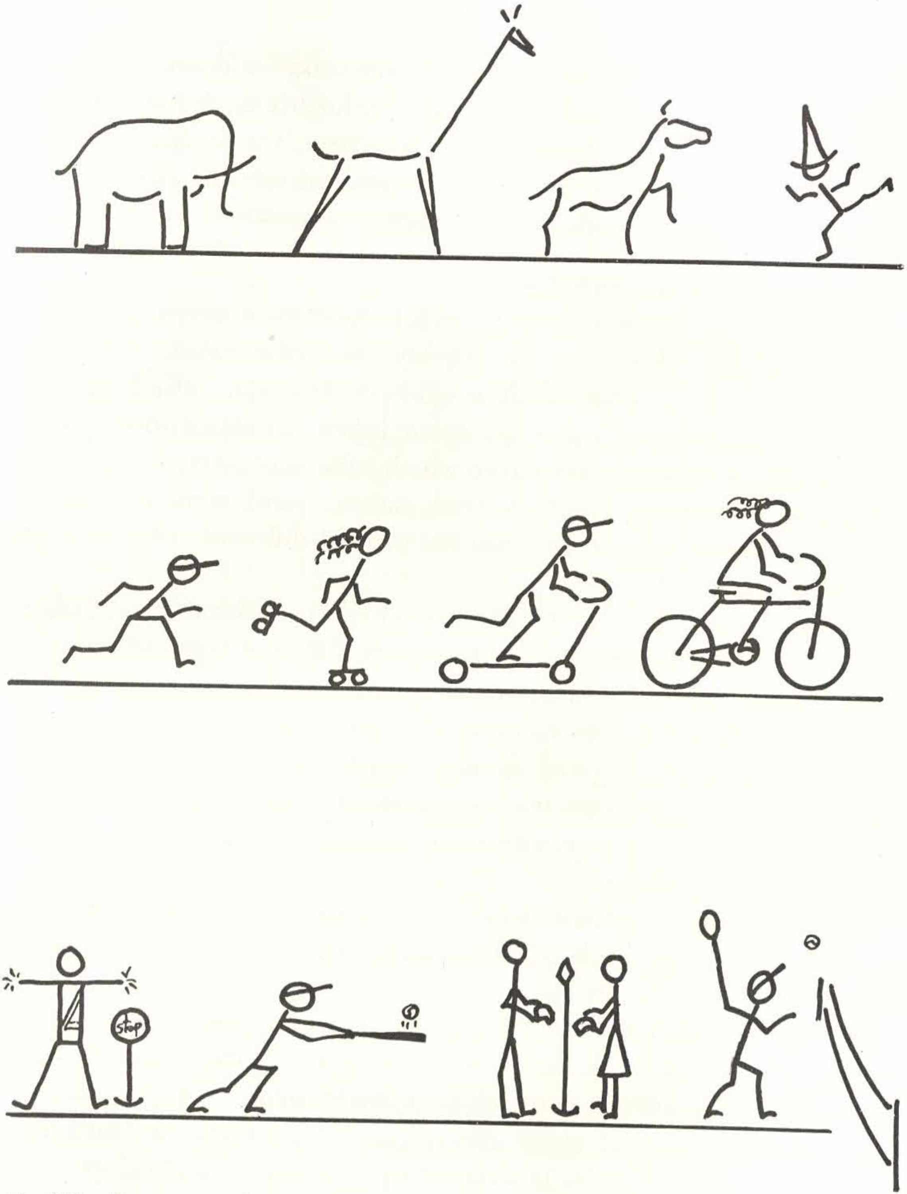

Fig. 3.10. The cartoon technique applied to a parade of animals, pupil-developed safety rules and regulations, and junior-high-school club activities.

cartoonists are artists. Many cartoons are rudimentary visualizations in which simple lines are used to outline objects. The use of this technique is shown in Fig. 3.10.

You can draw this well or better. Try it. Apply the cartoon approach to some situation you wish to describe to the class—announce an event, or remind them about the care of the desks, schoolroom, or their personal belongings. Soon you will develop a visual cartoon "vocabulary" of simple line drawings which anyone can use to give added interest, fun, and clear-cut visualization to chalkboard learning situations.[4]

IS COLORED CHALK SAFE?

White chalk gives high visibility when used on a green, yellow, or black chalkboard. For most day-to-day uses—directions, word lists, activity diaries, etc.—white chalk is effective. In certain situations—diagrams of things to make, maps, geometric figures, or explanations of how things function—special needs arise which color may meet.

The parts of a flower, such as petal, stamen, pistil, stem, etc., can be more easily distinguished one from the other if different colors are used for each part.

In mathematics the use of color may enhance explanations: "Colored chalk is almost indispensable. In illustrating different types of polygons, it can be used to highlight the equal parts. It makes congruency much more obvious and the reasons for certain area formulas more distinct.

"In all types of graphs and algebra, colored chalk is a great visual aid. It is especially helpful when used to explain sign numbers since the direction sign and the number sign are never confused in explanations because they are different colors."[5]

In social studies situations chalkboard murals of people, animals, activities, and objects that are being studied can be more accurately portrayed in color than in white alone.

Colored chalk should be used when the visualization will take on greater meaning through its use. Color merely for color's sake is a poor argument for the use of colored chalk in the classroom.

In this day of concern about allergies periodic rumors are heard about the safety of colored chalk. In a recent survey on the use of colored chalk the authors were frequently questioned about possible injurious effects of using it. This question was referred to several chalk suppliers. One typical reply follows:

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[4] H. E. Kleinschmidt, *How to Turn Ideas into Pictures,* National Publicity Council for Health and Welfare Services, Inc., New York.

[5] S. E. McCurdy, "Colored Chalk Techniques for Basic Mathematics," *Mathematics Teacher,* December, 1948, pp. 369–371.

Years ago, we decided that the best solution to such problems for the crayon manufacturers, was to check this question just as sincerely and carefully as possible with the authority who (so far as we had information) was and is the country's leading Industrial Hygiene Expert. He is Dr. F. B. Flinn, formerly Assoc. Professor of Industrial Hygiene, Columbia University. For a good many years since then, we have accordingly been systematically and regularly checking our ingredients and formulas for our School Chalks, White and Colored both. We have been checking these ingredients and formulas regularly and systematically with Dr. Flinn on the point in question. Just a short time since, in his regular check-up, Dr. Flinn again authorized us to say that these school chalks (both white and colored) are "C P"—in other words, he authorized us to say that he found them to be "Certified Products," meaning that they contain "no toxic materials in sufficient quantities to be injurious to the human body."

Of course, there is always the question of allergies, just as you suggest in your letter—that is, some people are susceptible to substances which are 100% harmless to most, as you know. But the writer can truthfully say that over the years, there has been no authenticated case called to his attention, where our School Chalks, White or Colored, have been known or shown to have caused a Health Set Back.[6]

These illustrations of chalkboard techniques have of necessity been limited to a scattered few. Indefinite numbers of uses could be described.

With these basic techniques in hand, the teacher is limited only by his own ability to coördinate subject teaching problems with the opportunities which chalkboard illustrations afford. By using the various techniques outlined above, the teacher may realize that he does not need to be an "artist" in order to use the chalkboard effectively.

The use of white on black, or color on a pastel background, or any combination of these can improve and motivate what pupils and teacher plan, investigate, and learn.

THE ROLE OF THE CHALKBOARD IN INSTRUCTION

To be used with greatest effectiveness, the chalkboard must carry written or graphic messages that are integral parts of the classroom work being accomplished. Motivational uses of the chalkboard are innumerable. A primary-grade teacher reports that, before the children come into the room for the morning's work, she places on the chalkboard questions which she knows will capture their imagination. Recently, in getting

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[6] The American Crayon Company, Sandusky, Ohio.

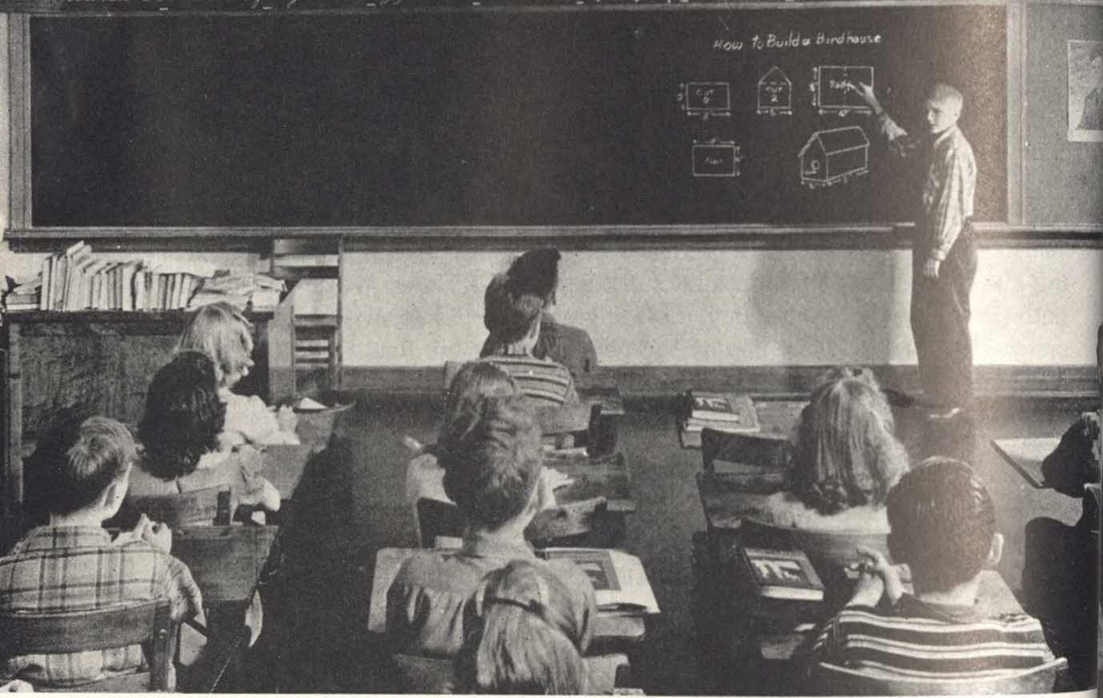
How to Build a Birdhouse

Fig. 3.11. The chalkboard is used to visualize oral communication. Complicated diagrams should be drawn in advance. (Courtesy of Weber Costello Company.)

ready for a unit of work on children of Mexico, she included such questions as these:

1. What pets do Mexican children like?
2. Do Mexican children play the same games as we?
3. What kinds of schools do Mexican children attend?
4. What radio programs do children in Mexico listen to? Do they attend movies?
5. How do Mexican children help each other? Their mothers and fathers?

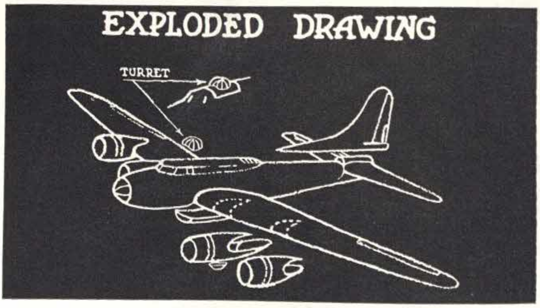

Fig. 3.12. The chalkboard is used to visualize vocabulary. Exploded drawings dramatize details. (Courtesy of The Manual Arts Press.)

In preparing for a unit on transportation another teacher in the intermediate grades carefully drew several chalkboard sketches of unusual kinds of transportation: a dugout canoe and outrigger, a Japanese rickshaw, a camel, an umiak, and a sampan

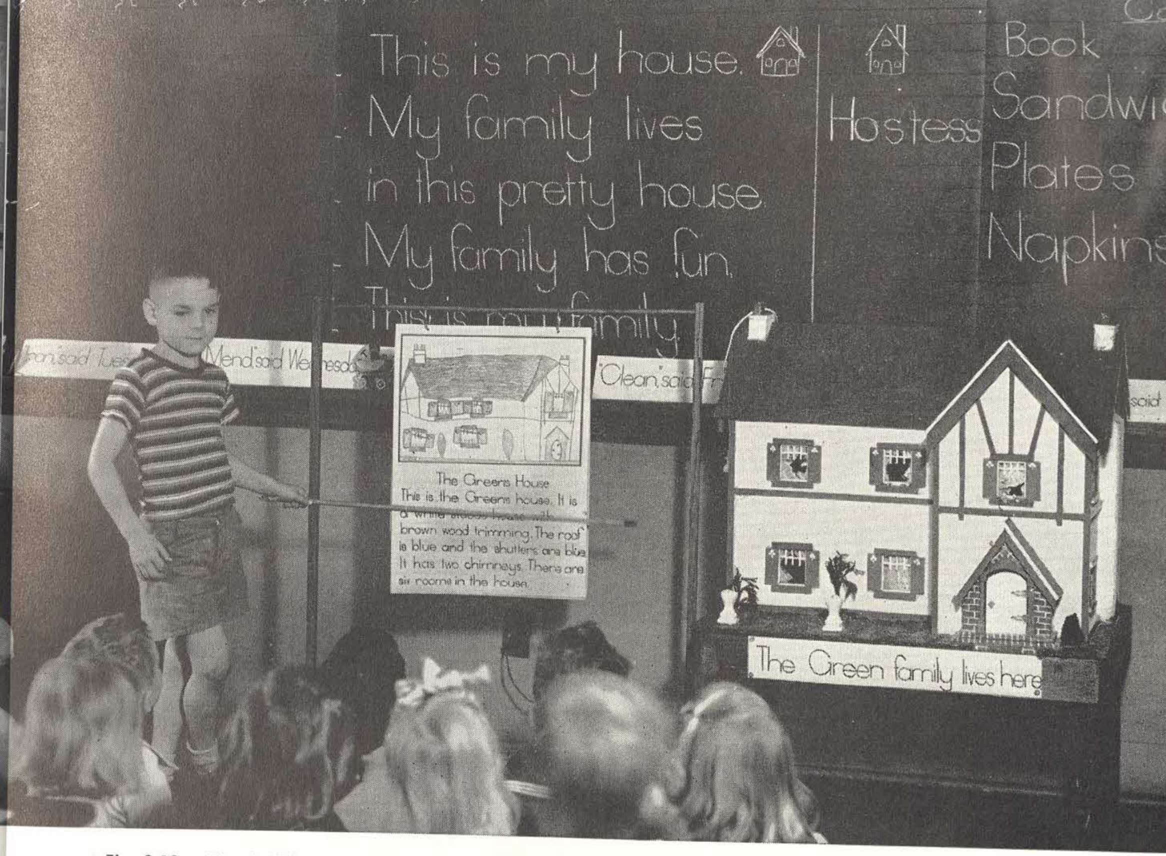
This is my house.
My family lives
in this pretty house.
My family has fun.
This is my family.
Hostess
Book
Sandwi
Plates
Napkins
Mend said We
Clean said
The Greens House
This is the Greens house. It is a white house with brown wood trimming. The roof is blue and the shutters are blue. It has two chimneys. There are six rooms in the house.
The Green family lives here

Fig. 3.13. The chalkboard is used to summarize experiences. Its use with charts and models heightens interest. (Courtesy of Topeka, Kansas, Public Schools.)

under full sail. Under these drawings she wrote questions such as the following:

1. When did people use this kind of transportation?
2. In what parts of the world are these used?

During succeeding days other simple line drawings of transportation devices characteristic of other parts of the world in the past and today were used in the same manner. The curiosity-arousing blackboard drawings drew endless questions from the children and led quite naturally to discussions of how the answers to these questions could be located. In this way a unit of study was begun.

Demonstration uses of the blackboard offer the teacher the opportunity of accompanying verbal explanations with simple sketches or line drawings of processes, things, or ideas diagrammatically expressed so that the visualization can accompany the verbalism. The geometry teacher who is explaining the Pythagorean theorem would be quite helpless without the simple line relationships which visualize thinking and developmental explanation.

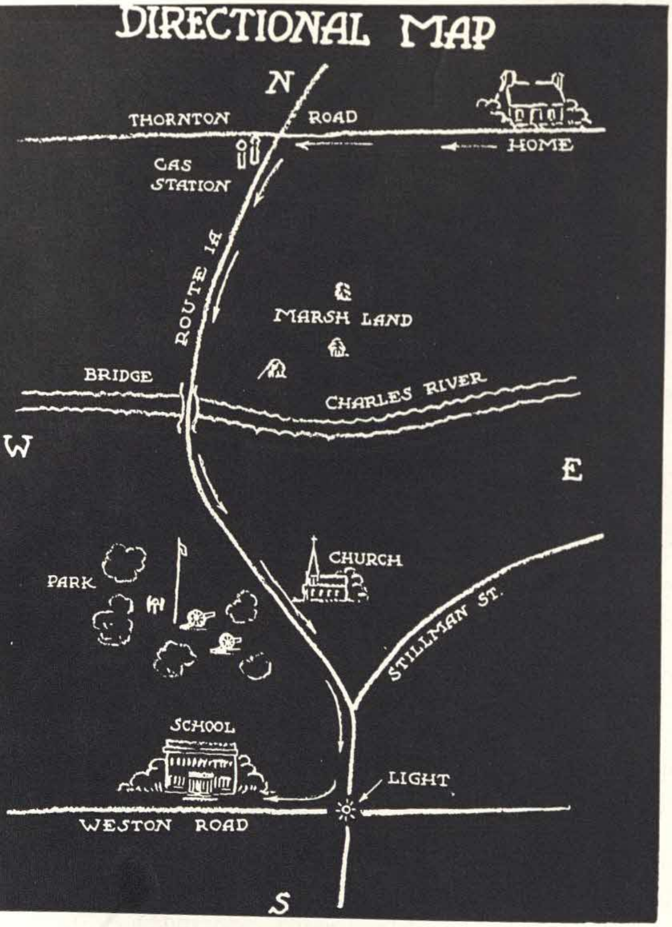

Fig. 3.14. The chalkboard is used to begin map understandings. (Courtesy of The Manual Arts Press.)

The student who is attempting to draw up a list of materials used in the construction of a bird house is soon lost unless he draws the plans (Fig. 3.11) and then tabulates and itemizes the various pieces of stock he needs. As he does this, he allows his classmates to hear and to visualize his explanations.

The social studies teacher who uses group planning techniques in working out an approach to the study of a foreign country uses the chalkboard with great effectiveness as he catalogues the interest the children evince in the new country. In this situation the chalkboard is a going record of progress and of the evolutionary thinking done by the students.

The uses to which chalkboard techniques may be put as a means of illustrating, supplementing, clarifying, and outlining classroom procedures are as varied as the subject-matter responsibilities and grade levels of the modern school. At one extreme may be the visualization that tells a complete story and may become the core activity around which an entire discussion may revolve. The exploded drawing (Fig. 3.12) which shows the piece-by-piece structure of a modern aircraft may become the focal point of attention as the junior-high-school teacher explains the structural functions and parts and relates each to the specific vocabulary which the students will learn as the result of the discussion.

The chalkboard may be used in relation with other teaching materials such as models, experience charts, and flash cards, all of which ultimately create relationships and understandings of the symbols and the objects for which these symbols stand (Fig. 3.13). Through this type of interrelated use of the chalkboard, the primary teacher effectively imparts reading comprehension.

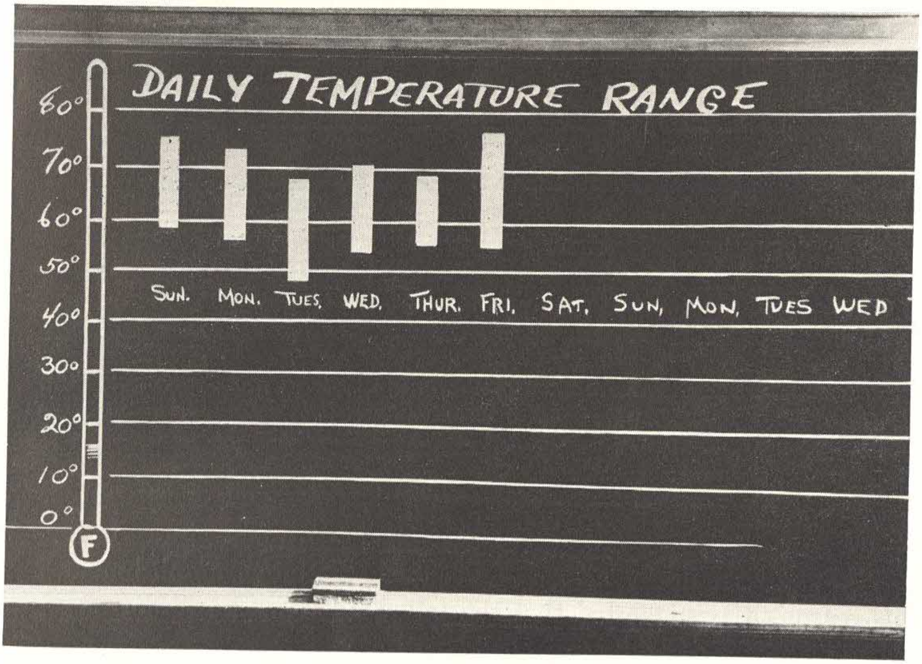

Fig. 3.15. The chalkboard is used to visualize temperature readings. Daily information is easily chalked in. (Courtesy of Weber Costello Company.)

The chalkboard can become an accessible medium for tabulating community geographic features in symbolic form (Fig. 3.14). Another interesting use is for tabulating temperature range during a calendar period, as shown in Fig. 3.15.

Some advantages of using a chalkboard in the learning process are:

1. The chalkboard can become an integral and valuable part of pupil-teacher planning.

2. The chalkboard can be a means of motivation. It can be used for recording the progress and status of pupil-teacher planning.
3. The chalkboard is useful in recording progress by documenting trial-and-error approaches to subject-matter responsibilities.
4. The chalkboard permits quick change and rearrangement, both valuable in documenting developmental thinking.
5. The chalkboard may become the medium through which group projects are worked out. Group projects in the social studies, art, arithmetic, nature study, history, and in other subjects can be planned, illustrated, and summarized by means of chalkboard techniques.

EVALUATION

Since the orderly use of the chalkboard must at some time be evaluated in terms of the opportunities it affords for improved teaching, the suggestion is made here that following a chalkboard demonstration, explanation, work progress, or assignment pupils and teachers join in discussing its effectiveness.

Basically, chalkboard teaching techniques are good or ineffectual in terms of whether or not the use of the chalkboard contributes to higher levels of understanding, interest, and subject-matter accomplishment. For this reason, it is suggested that the following items be discussed as at least one means of evaluating chalkboard use.

Chalkboard Techniques

1. Did our use of the chalkboard illustration help us in our study of the work we are pursuing? Yes .... No ....
2. Did our chalkboard information present a learning opportunity which was beyond what we could have learned from more accessible, more easily arranged materials? Yes .... No ....
3. Did our whole class (where possible) help in creating the chalkboard display, each in terms of his own interest and ability? Yes .... No ....

Mechanics

1. Was the chalkboard display free of glare? Yes .... No ....
2. Was the chalkboard display uncluttered, pleasing in appearance? Yes .... No ....

3. Was it organized around the focal point of interest? Yes .... No ....
4. Were titles neat, and headings, captions, and phrases meaningful and as brief as possible? Yes .... No ....

SUMMARY

No teacher need say, "I'm interested in visual instruction methods, but my school doesn't give me any money for them."

Any interested teacher can begin to study the improvement of instruction by becoming a more effective user of chalk and chalkboard.

The chalkboard (blackboard) is one of the oldest graphic or visual instruction devices. The former blackboard slate has now been replaced by white, green, or yellow satin-surfaced or glareproof glass or plastic chalkboard.

Chalkboard materials for writing, drawing, and illustrating should be available to every classroom teacher; these include white and colored chalk, rulers, compasses, templates, patterns, stencils, etc.

Although many teachers feel that they have to be gifted artistically to use chalkboard visualization, this is *not* the case. The teacher-artist has a natural advantage, but there are many techniques of chalkboard teaching which can be easily learned by any interested teacher. Among these are:

1. Careful selection of usable chalkboard space, attention to size of letters, use of properly prepared chalk, etc.
2. Use of printing, proper spacing, guide lines, etc., to increase legibility and therefore understandability.
3. Preparation of stencils when outline maps, diagrams, scales, etc., are used repeatedly.
4. Use of the grid method and the opaque projector in transferring useful but hard-to-draw diagrams, charts, pictures, etc.
5. Use of the hidden drawing technique to add flexibility, imagination, and high interest to chalkboard teaching.
6. Mastery of elementary stick figure or cartoon technique for dramatizing and imparting interest to chalkboard teaching.

The chalkboard is a universally "available" teaching device. With reasonable study and practice anyone can become an effective user of it.

Suggested Activities

1. Page through professional education magazines and locate names and addresses of chalkboard manufacturers and suppliers. Write to these sources for current information about chalkboard surface material, chalk, templates, compasses, rulers, etc. Prepare this information as a "source" list for future reference.
2. As you observe your critic teacher, fellow practice teachers, or colleagues in their teaching assignments, list the possibilities you find for the improvement of study situations through chalkboard use. Under the heading "Chalk Talk Opportunities" enter notations of how diagrams, instructions, special illustrative explanations, etc., might have helped to clear up pupil questions or have been "short-cut" and "time-saving" devices.
3. As you prepare lesson plans, sketch in chalkboard teaching ideas. Report on the success of these diagrams, graphs, or other pictorial explanatory devices after you have tried them out in teaching situations.
4. Demonstrate how to select and prepare a chalkboard panel for use (in the classroom in which you meet to study visual instruction). Demonstrate your ability to handle problems of glare, size of lettering, care of chalkboard surface, erasing, freehand line and circle drawing, etc.
5. Show your ability to heighten interest in chalkboard illustration through your use of stick or cartoon figures.
6. Make a chalkboard ruler, compass, stencil, and template. Demonstrate how you will use them in connection with the subject you teach or will probably teach.
7. Using suitable graphic subject material, show your ability to enlarge and transfer a small drawing or picture to a chalkboard by means of the grid method and the projection method.
8. Discuss the problem of visibility. Include seating, angle, light sources, printing size, correct use of chalk, correct width and sharpness of chalk.
9. Discuss the use of color in chalkboard illustrations related to your special subject interest or responsibility.
10. Discuss examples of effective chalkboard use by teachers under whose direction you have worked or now are working.

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4. Flat Pictures

As she came into her room after recess, Miss Brewster noticed several youngsters engrossed in a display of pictures she had just put on a bulletin board (Figs. 4.1, 4.2).

"Gee," she overheard one saying, "look at the Diesel locomotive. Boy, that's really something."

Another said, "Yeah—and look at this big freight engine—I bet that's the biggest engine in the world."

"Nah," said a third boy with a knowing air, "that's not the biggest. I saw the biggest one down at the Railroad Fair last summer. It's a Union Pacific 4-8-8-4. I got a picture of it at home."

"Would you like to bring that picture, John?" asked Miss Brewster, joining the group.

"Sure," said John, "and I've got a lot of others, too—the Super Chief, the Train of Tomorrow, and lots of the old-time trains that they had in *Wheels A-Rollin'*." By that time other children had gathered around and a high degree of interest was evident. A few well-chosen pictures were getting the unit on modern transportation off to a flying start.

In another classroom a group of junior-high-school pupils were discussing the subject of advertising. The teacher placed one of a series of colorful soap advertisements in the opaque projector and the students gazed at it intently.

"What have you noticed about each of these ads?" asked Mr. Johnson.

Fig. 4.1. A picture can excite the imagination. (Photo by T. J. Donahue, in *Trains.*)

"They all have a good-looking girl in them," volunteered Joe.

"Each calls itself the best or kindest to your skin," added Mary.

"They're all interesting and attractive," said another boy.

"They all use words like 'best,' 'most suds,' 'creamy,' 'soft,' 'fluffy,' 'snowy,' 'pure,' " added a fourth pupil.

"It looks as if everyone tries to find the best picture they can think up so as to attract attention to their ad, and all use the same kind of descriptive words. It makes you wonder how can all be best—are they telling the truth?" summed up another lad.

Thus ideas, leads, questions, suggestions for further activity, high group interest, a challenge to creative thinking—all were stimulated by the addition of a few pictures to a learning experience.

With the coming of spring, a primary reading class eagerly followed Miss Barstow's story about birds migrating back from the southland. The

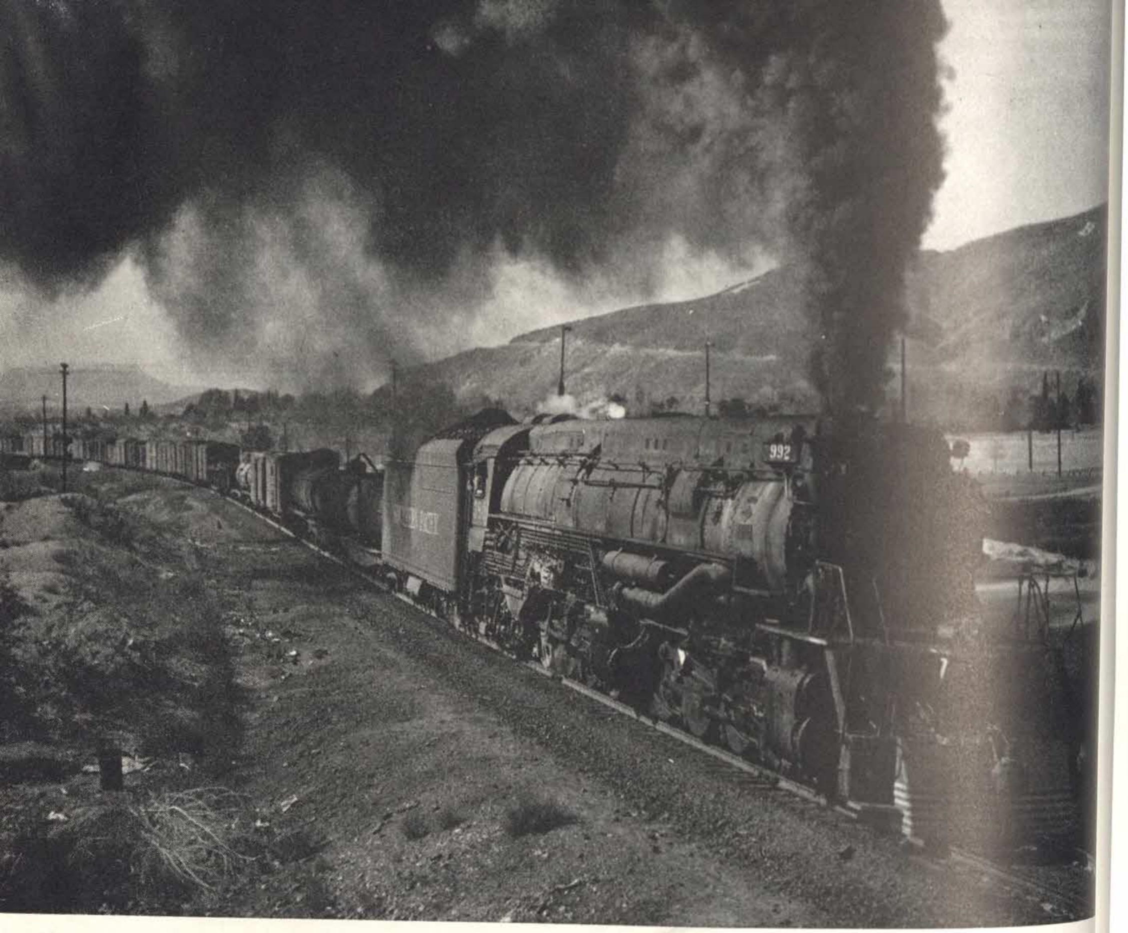

Fig. 4.2. An impression of great power is captured in this picture. (Photo by James Bowie, in *Trains.*)

pupils participated enthusiastically in planning a field trip to a nearby park in order to *see* some of the spring birds they had been reading about. As an additional stimulus Miss Barstow showed a film about robins and used a number of good pictures brought in by the pupils. As free "reading" she had several sets of colored stereographs showing many birds in their natural surroundings and in striking three-dimensional realism. "Robins," "bluebirds," "blackbirds," "swallows," "wrens"—these names came to have vivid meaning as pictures, stereographs, and first-hand seeing gave the words meaning in terms of the child's experiences.

FLAT PICTURES A UNIVERSAL LANGUAGE

The flat picture is an old familiar friend. On every side pupils and teachers alike are constantly exposed to pictures—pictures in newspapers, magazines, books, comics, billboards, cartoons, posters, even on postage stamps.

Taking pictures has become a common hobby among young and old alike. No vacation is complete without at least a few photographs of the locale and of memorable scenes, events, and people. Pictures capture slices of reality—and tell a story in a language all their own.

During recent years the picture medium has been used extensively in national magazines devoted largely to pictures as a means of expressing ideas. The significant contribution of these publications lies in the shift in emphasis from a minor to a major function they have given pictures in news and feature writing. Whereas formerly pictures served primarily to supplement or clarify the printed word, their role has now been elevated to the point where *they* tell the story, with the help of brief paragraphs of identification and explanation. This is a great forward stride in the communication of ideas, a revolution that is only now beginning.

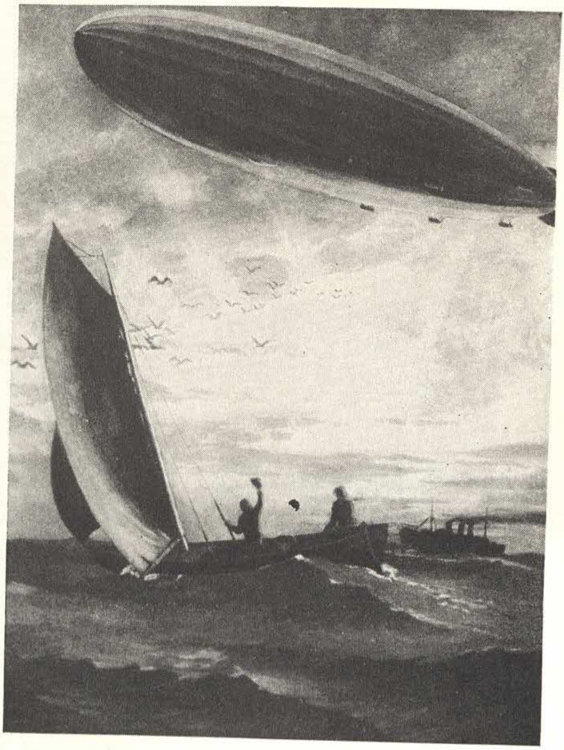

Fig. 4.3. Is this a good picture for use in teaching? Why?

ESSENTIAL CHARACTERISTICS OF FLAT PICTURES

What essential characteristics must a picture have to be valuable for classroom purposes? Clearly, both artistic and educational factors must be considered in answering this question. Let us examine a few pictures as we consider these factors. The picture shown in Fig. 4.3 was submitted by an intermediate-grade teacher for evaluation. As you look at it, what impression do you receive? What is the picture trying to say? Does it say this effectively? Will it convey essentially the same impression to most pupils who see it, or is there likely to be some confusion? Does it please you? Why? Does it convey accurate impressions and information?

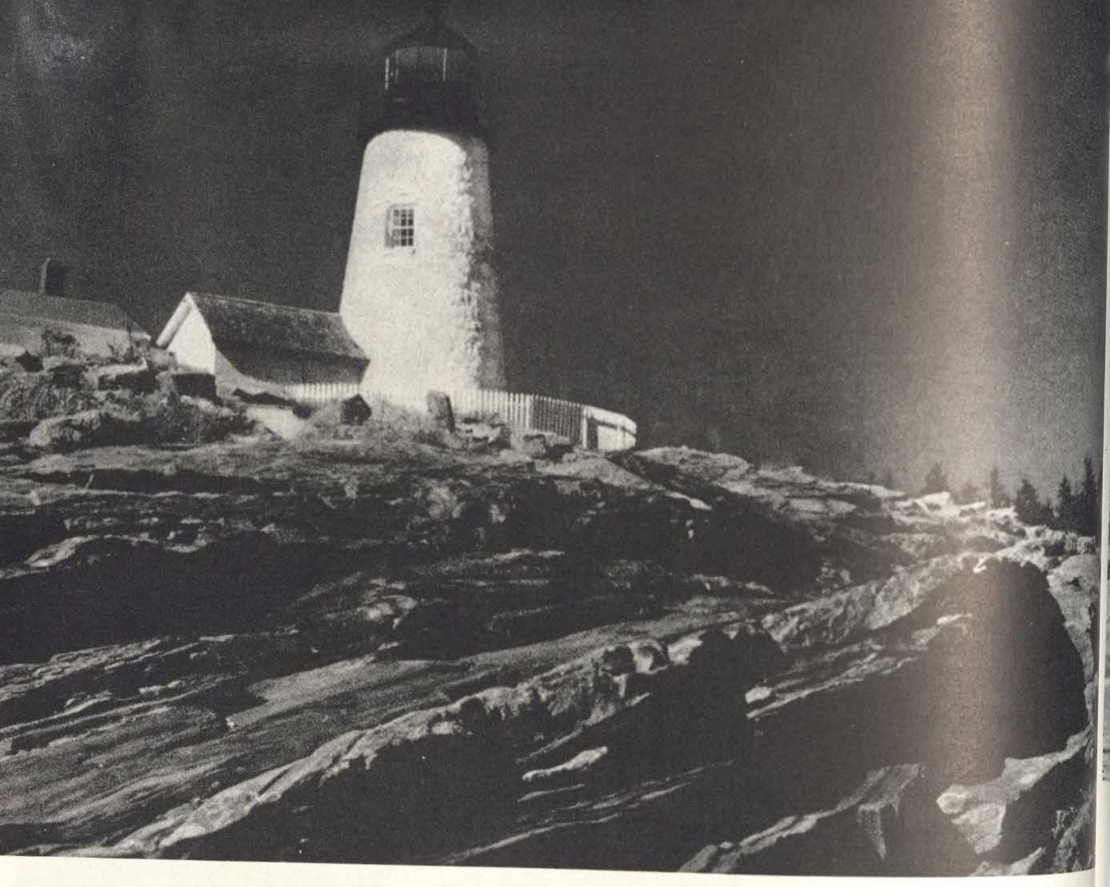

Fig. 4.4. Lighthouse.

Now ask the same questions about the picture shown in Fig. 4.4 and compare the effectiveness of the two pictures in your judgment.

Flat pictures are a "still" medium. The term "still pictures" is frequently used to describe flat pictures. This use is inadequate in that it fails to distinguish between projected and nonprojected pictures or between opaque pictures and transparencies. On the other hand, it does suggest one characteristic of flat pictures, namely, that they are motionless.

One of the more suitable applications of flat pictures is accordingly the still scene, like that shown in Fig. 4.4. Such scenes as landscapes, mountains, forests or trees, buildings, objects, animals or people in a still position are natural subjects for flat pictures. An important phase of both art and photography deals with "still life."

Flat pictures can suggest motion. A street scene in a flat picture may

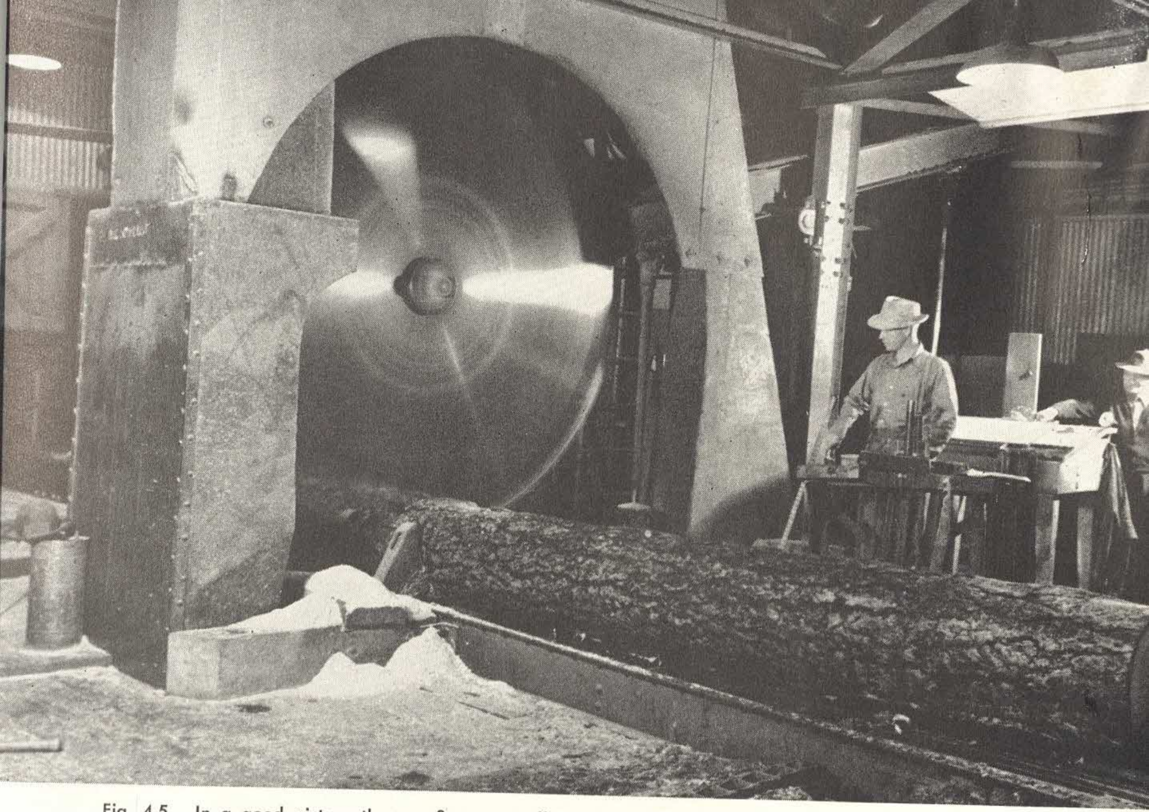

Fig. 4.5. In a good picture the eye fixes naturally and readily on the center of interest, as in the above. (Courtesy of Edward Hines Lumber Co.)

show several types of activity very effectively. People are walking, cars are passing, branches are swaying in the breeze and you have no difficulty in sensing the motion which is present in the scene. This is due partly to experience and partly to techniques employed in the picture itself.

Being familiar with similar street scenes, you know that automobiles in motion are a typical part of such a scene and your mind supplies the motion accordingly. Similarly you know that the people on the sidewalk are going somewhere and hence you supply motion to them also.

There are, in addition, numerous cues in such a picture that suggest motion. People's arms are in a swinging position and their feet are shown in several stages of taking a step. A flag is extended and a man is holding the brim of his hat, so you know a breeze is blowing. Numerous devices of this nature suggest motion. Some, such as the stroboscopic pictures of a track event, are obvious. Others are subtle. As you look at the pictures

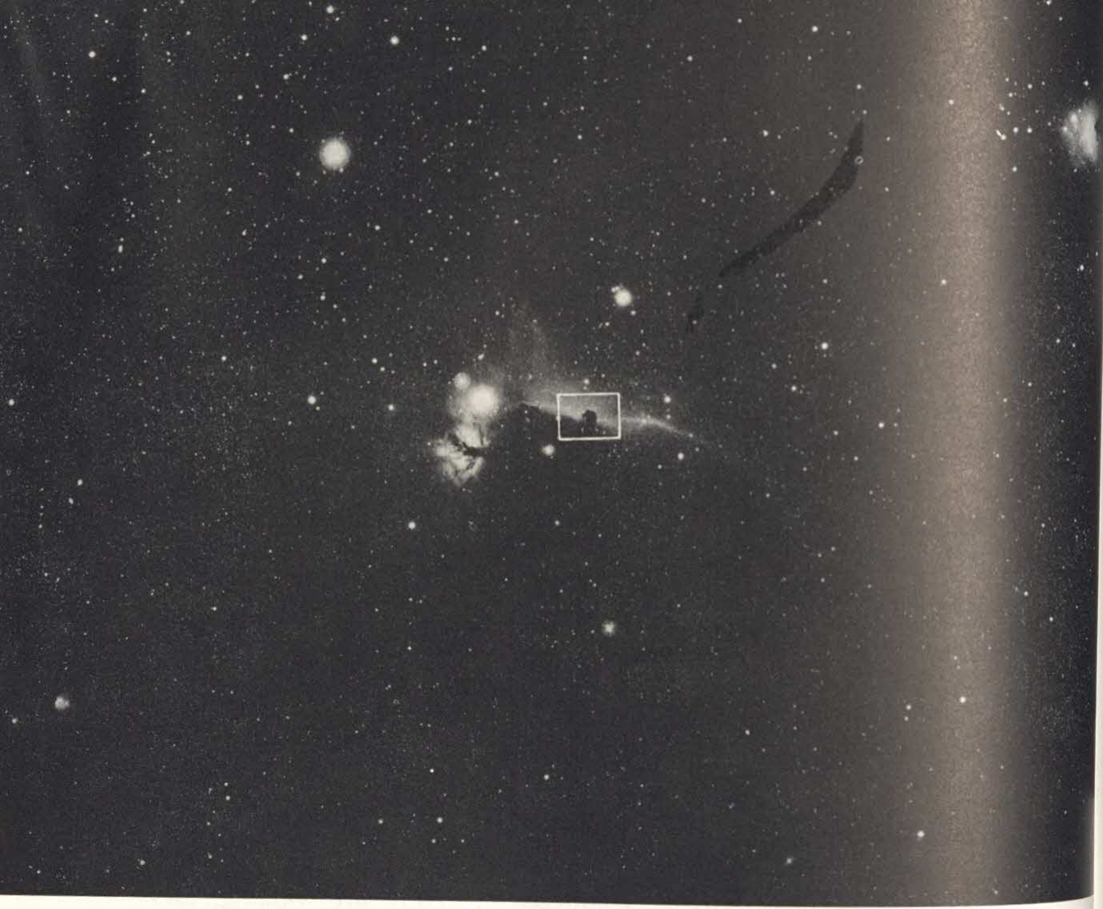

Fig. 4.6. A nebula spotted by a smaller telescope is photographed in enlarged detail (see opposite page) by the "Big Eye" on Mount Palomar. (Mount Wilson and Palomar Observatories Photo.)

in this chapter, note the means employed to convey the idea of movement.

Flat pictures emphasize key ideas and impressions. Elsewhere in this chapter, in considering the evaluation and selection of flat pictures, we say that a good picture presents one principal idea. There is a well-defined center of interest and the whole scene contributes to what the picture has to say (Fig. 4.5). A kaleidoscopic shot of the beach at Coney Island conveys one impression; a shot of a single bather or a small group conveys an entirely different impression. In either case there is an idea around which the picture is built. This emphasis on a key idea or impression greatly enhances the value of flat pictures in instruction.

Flat pictures lend themselves to detailed individual study. The flat picture has several other advantages. It provides opportunity for careful,

detailed analysis at the learner's own rate and interest level. He can examine it as often and as long as he wishes. The presentation of extensive detail is likewise possible in a still picture. One of the chief uses of the 200-inch telescope on Mount Palomar is to secure hundreds of still photographs of the heavens so that astronomers in any part of the world may study them at their convenience (Fig. 4.6). A series of illustrations showing how to tear down and reassemble a motion-picture projector is similarly of great value to a service man because of the infinite detail such pictures can supply.

Flat pictures are flexible and cover a wide range of subjects. One of the most familiar characteristics of flat pictures is their versatility. Practically anything that can be photographed or represented pictorially can be shown on flat pictures. This range of subject matter—from concrete objects to abstract ideas (Salvador Dali and the surrealist school of painting)—constitutes one of the chief advantages of flat pictures in teaching. Great numbers of pictures available at slight cost likewise raise the question of selecting the best pictures for the teaching job to be done.

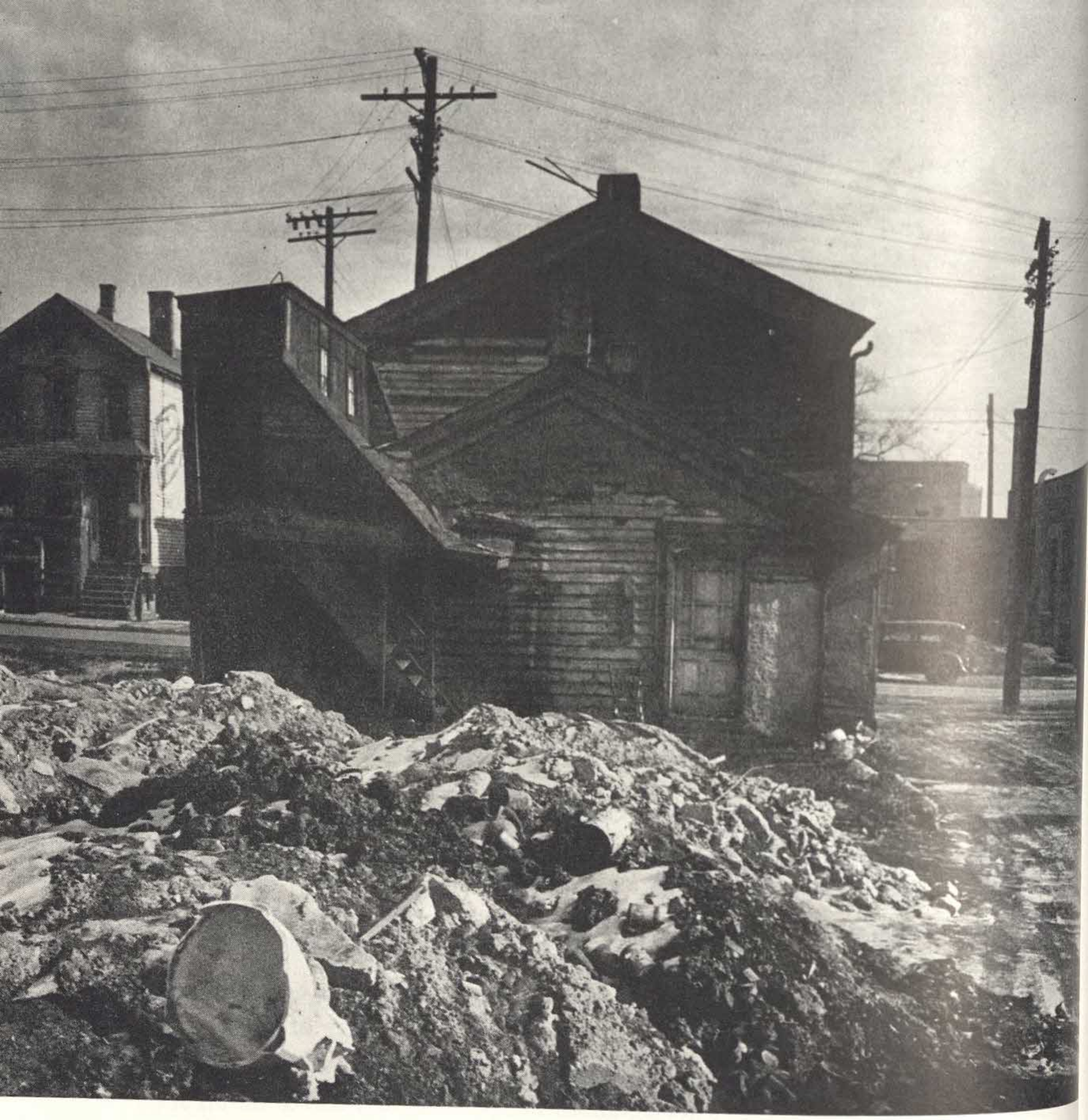

Fig. 4.7. An effective picture need not be pretty. (Courtesy of Milwaukee Housing Authority.)

SOME CRITERIA FOR SELECTION

Having determined specific teaching purposes to which good flat pictures can contribute, the teacher will next want to judge the relative merits of available pictures in terms of a few clear-cut standards.[1] These standards naturally must include both artistic and educational considerations. The following six criteria are presented as a practical guide in the selection of still pictures for classroom use: artistic quality, clarity, truthfulness, interest, suitability for teaching purposes, and size.

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[1] See Lelia Trolinger, *The Evaluation of Still Pictures for Classroom Use,* Educational Screen, 1939, pp. 1–49, for a comprehensive study of expert judgments on the relative significance of a number of technical and instructional criteria in the evaluation of still pictures.

ARTISTIC QUALITY

Basically, artistic quality means simply, "Is the picture effective in terms of the artist's purpose?" An artist may analyze a picture in such terms as proportion, perspective, balance, and unity; but a teacher does not have to be trained in art to know whether or not a picture creates the desired effect. This effect may be pleasing or otherwise. A good picture of a slum area, for example, may emphasize the filth, squalor, and misery of life in crowded, unsanitary surroundings. It may be anything but pretty to look at and still be a good picture (Fig. 4.7). It is true that all pictures do not seem equally effective to different people, but certain characteristics may be expected to be present in teaching pictures that are generally regarded as artistically acceptable.

Good Composition

The fundamental characteristic of an artistic picture is good composition, or good overall organization, such as is shown in Fig. 4.8. Basic to such organization is a clear-cut center of interest to which the rest of the picture contributes by such means as the balance of the picture as a whole, the position and direction of lines, the placement of masses, and the use of light, shadow, and color. The focus of interest is rarely in the center of the picture, a position other than the center being more pleasing, as a rule, to the eye. The presence or absence of a good center of interest can be readily ascertained by allowing the eye to travel until it fixes on a point of key interest. Look away from that point and see whether or not your eyes tend to go back to it. In a picture of a group of birds, for example, the observer's eye should naturally fix on one bird in the group.

Effective Color

The use of harmonious and effective color is a second mark of good art. Colored pictures selected for use with children should generally be true and natural in color. Color values in nature are seldom primary reds, blues, greens, and violets; rather they are composed of infinite variations

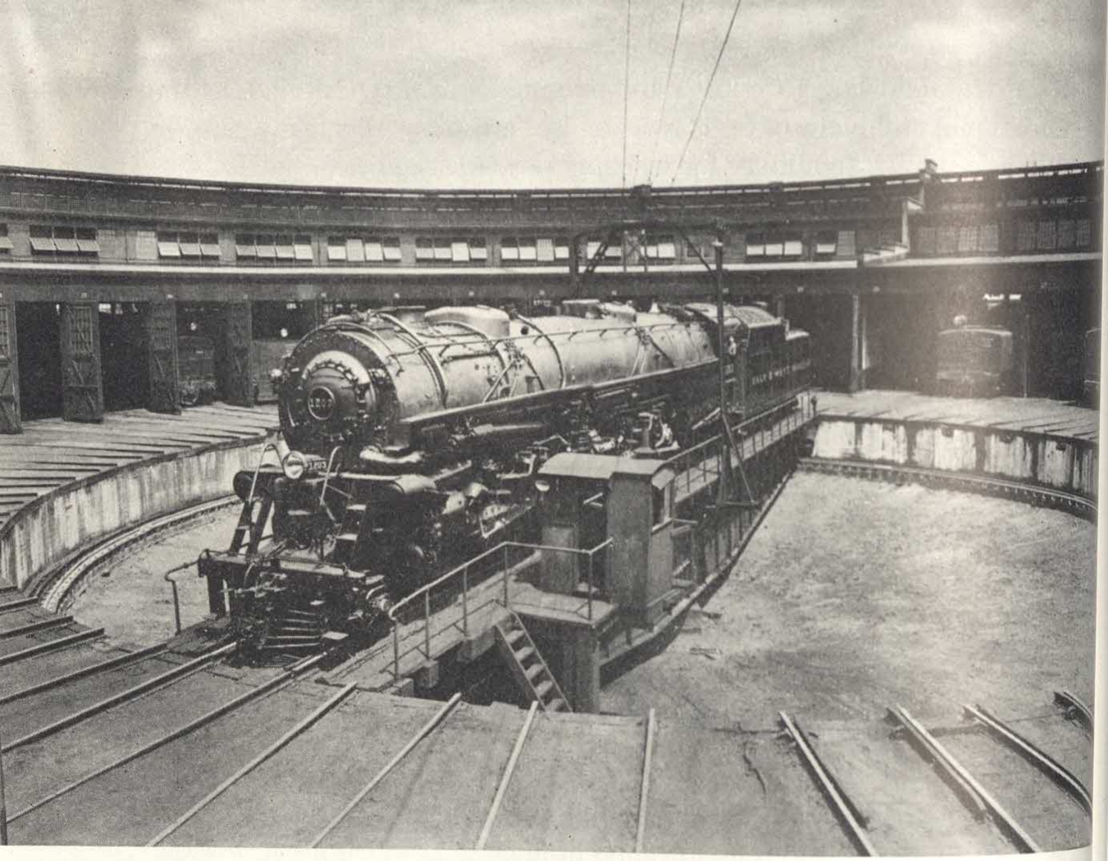

Fig. 4.8. The center of interest here is emphasized by lines, mass, and lighting. Note how each factor contributes to the total effect. (Courtesy of Norfolk & Western Railway.)

of these colors. Hence, where color is important in a teaching situation it should be as true as possible.

An exception to the above statements must be recognized with respect to art subjects in which color is used as a dominant means of expressing ideas. Thus children pay little attention to natural colors in expressing themselves in paint or crayons. Trees may be purple splashes, a locomotive a racing giant in flaming red, yet the pictures are highly meaningful to the young artists.

Likewise in observing such pictures, if they are good pictures children seem to experience little difficulty in grasping the artist's idea. For an art class or any other class in which unique or unusual illustrations bring out a particular point well, "impressionistic" pictures of this type may be entirely suitable. The decision as to whether or not to use abnormal colors must, of course, be based on the specific purposes of the lesson. Informational concepts are normally conveyed most effectively by accurate color renditions.

It should also be noted that black-and-white photography can provide a wide variety of color impressions. Study of the gray scale (a scale of uncolored shades from black to white) suggests the many subtle variations in value that are possible with black-and-white film (see Fig. 4.9). Because of its greater flexibility, many photographers prefer working with black-and-white film whenever color is not an essential element of the picture. For the same reason, it is often well for the teacher to select good black-and-white photographs rather than mediocre colored pictures, especially when color is only incidental to the subject being taught.

Technique

A third characteristic of good pictures is the technique of the artist or photographer. More so than is true of composition and color, technique may be and frequently is a highly individual matter. A person with only a casual artistic acquaintance has little difficulty in recognizing the distinctive quality of a painting by Van Gogh or Rembrandt. Likewise, a student of photography soon learns the unique characteristics of the work of outstanding photographers. The important point in selecting pictures for classroom use is simply that whatever the technique employed, it should be effective and of high quality.

CLARITY

Clarity and sharpness constitute a second major consideration in the selection of pictures for school use. Although softness of focus is effective in portrait work and for the portrayal of certain moods, most educational subjects are better illustrated by pictures which are clear and sharp. The sharp picture with strong contrast provides better opportunity for accuracy and detail—a better representation of reality—and thus is preferable when information is the primary objective in picture use.

TRUTHFULNESS

The effectiveness of a good picture makes it a powerful teaching tool. It is important that the impressions left in a child's mind be correct and

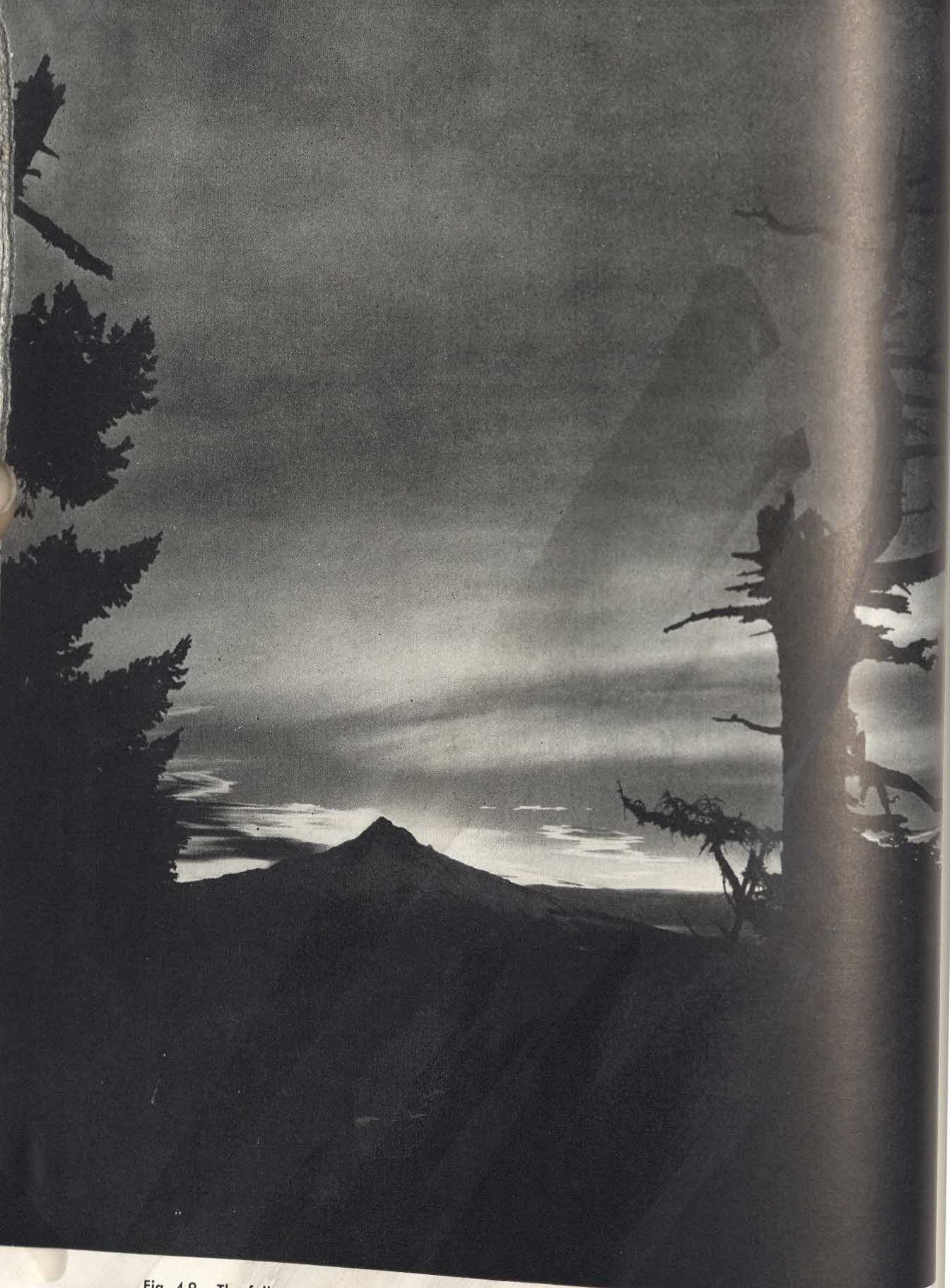

Fig. 4.9. The full range of the gray scale is included in this beautiful shot of Mount Hood at sunrise. (Photo by Ray Atkeson.)

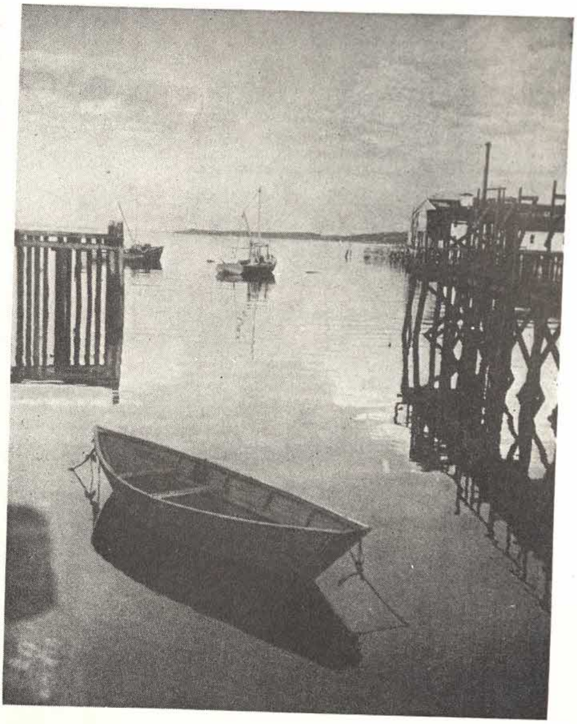

Fig. 4.10. The familiar scene need lack nothing in attractiveness or interest.

truthful, insofar as the picture can make them so. This means that the photograph, painting, or illustration must provide both a true general impression and accuracy of detail. To accomplish this, the picture in most instances should be typical like that shown in Fig. 4.10, rather than unique or startling. The unfortunate fact that the unusual scene frequently lends itself more readily to picture making than the ordinary run of events should make the teacher pause and think when considering the factor of truthfulness.

The dramatic, thrilling, and unusually beautiful scene has its place in the schoolroom, but the overliberal use of such pictures in our textbooks has helped contribute to impressions held by many adults that the Alps are nothing more than a series of peaks like the Matterhorn; that Holland is a land made up of windmills, tulip fields, quaint costumes, and wooden shoes; and that the westward movement in the United States consisted primarily of a series of Indian battles, interrupted occasionally by the necessity of watering the stock, dodging a buffalo stampede, or sending a message to General Custer.

INTEREST

It may appear somewhat inconsistent to maintain that a picture must be typical rather than unusual and at the same time that it must be highly interesting. Yet interest among children tends to be attracted by a vast number of ordinary things with which they are familiar. For instance, consider the great interest usually shown by children in pictures of animals or other children, or of trains, ships, or airplanes; a good example of this type of picture is shown in Fig. 4.11. To each of these the child brings some degree of familiarity which helps to arouse his curiosity and to give

Fig. 4.11. A child and a pet have universal appeal. (Photo by Don A. Navo.)

an outlet to his imagination. Thus, pictures which are real and vivid, which have a good center of interest, and which deal with subjects containing elements already familiar to the student, are inherently interesting and stimulating.

SUITABILITY TO TEACHING PURPOSES

Regardless of how attractive, stimulating, and otherwise acceptable a picture may be, it is of little use in a lesson unless it adds something valuable to the learning situation. In other words, a picture must "hit the nail on the head"—must convey an idea, a segment of information, or a concept that is exactly what the teacher wants. An essential step in selecting *any* teaching material is determining the degree to which it meets the learner's needs. This is obvious and requires little explanation, but it is so important that unless it is emphasized it may be minimized or overlooked, and thus make the use of the flat pictures inconsequential.

Suppose, for example, that Miss Brewster is selecting pictures for a lesson on animals. One of her general objectives is to develop an understanding of how to care for pets; another, to build attitudes on conservation with respect to wildlife in general; a third, to bring out how animals are adapted to their environment. For this particular lesson, however, she has a specific objective in mind—the identification of several birds which will soon be coming north. She comes across a picture of a cat crouching under a tree on a limb of which a robin has just alighted. The picture has a feeling of tense drama, it is extremely realistic and vivid, the colors are excellent, it is artistically good, and it is sufficiently large for the study of detail—in short, it is a fine picture. The only thing wrong is that it won't help much identifying a robin.

The whole impact of this picture on the child's mind will be whether or not the cat is going to get the bird. Hence Miss Brewster shrewdly passes it by, making a mental note to use it several days later in a lesson on how to protect our feathered friends.

She chooses, instead, a close-up shot of a robin in a characteristic pose on the lawn after a rain, its head slightly bent as if listening for worms, and its colors highlighted in the afternoon sun. The first picture is undeniably more fascinating and will get the children's attention, but it will not meet the objectives of that particular lesson as well as the less dramatic picture.

A further consideration in the selection of pictures to fit a specific teaching purpose is *grade level.* Although in most cases this is not a difficult problem, it must always be remembered that the determination of what is to be accomplished in a lesson must not be separated from the question "For whom?" This question does not constitute as serious a problem in most instances as it does in the selection of reading materials. Nevertheless, there must be fewer elements in a picture for young children than for pupils in higher grades, the pattern must be simpler, the idea less complicated.

This is, of course, quite natural because in terms of his experience the primary child can bring less *to* a picture than can his older brother and sister. To him a picture of an airplane is usually just an airplane, though he has probably learned to distinguish in his own mind between big planes and little ones. His ten-year-old brother, however, will very likely be able to identify the plane as a Constellation and will volunteer the information that it has four 2500-horsepower motors, has a triple fin and rudder whereas most planes have only one, and can carry over fifty passengers at a 300-mile-per-hour cruising speed.

Such variations in ability to read pictures are due to other factors than age alone—to intelligence, environment, prior experience in reading pictures, and imagination, to name just a few. The fact that there are such variations is sufficient cause for the teacher to consider the age and experience level of his pupils when choosing pictures for classroom use. In most cases his own good judgment will suffice to tell him when a picture has the right amount of detail, the appropriate degree of abstraction, and the necessary number of concepts for his purpose. He must also keep in mind the abilities and limitations of his pupils.

SIZE

The final question in picture selection is whether the picture is large enough to be seen readily by all the pupils in the classroom. The best picture is ineffective if it cannot be seen by all the children. An opaque projector will enlarge small prints so that the whole class can see them. When seeing becomes difficult, comprehension and interest are handicapped and attention soon wanders. You can easily illustrate this fact for yourself by noting which roadside signs you recall most readily after a drive in the country. Although several important elements other than size are involved here, the outdoor advertisements that are best recalled are usually the ones on large billboards.

MOUNTING PICTURES

Having selected suitable pictures, the teacher will wish to present them as effectively as possible. Their placement on the bulletin board or chalkboard and direct presentation by the teacher are both good; but whatever method is used, they must be made to appear to their best advantage. This usually means that flat pictures should be mounted. "A picture worth using is worth mounting" is a statement worth remembering, for psychologically it is both sound and practical.

Effective picture mountings can be done by any teacher. All that is necessary is imagination, a few inexpensive materials, and the application of one or two principles of good display.

PRINCIPLES OF EFFECTIVE MOUNTING

1. *Use generous margins.* Correct proportions for mounting pictures of various shapes are shown in Fig. 4.12. Note the width of the margins used. Note also that the bottom margin is *always* widest. Generous margins are not solely a matter of artistic taste but embody the direct application of the principles of attracting and holding attention. Any object tends to attract more attention when by itself than when crowded in among a number of other similar objects. Moreover, an appropriate mounting makes a good teaching picture more attractive just as an appropriate frame enhances a photographic portrait or a painting. In addition, the mounting protects the picture in handling and makes it easier to file.

2. *Use colors which direct attention to the picture and not to the*

mounting. This means that as a rule it is best to select for the mounting a color that appears in the picture in a relatively minor degree. This repetition of color creates a pleasing harmony in the total effect of the mounting and picture together. It is usually not wise to use a predominating color in the picture for the mounting because of the resulting loss of desirable contrast. A picture of a field of ripe grain will not appear to the best advantage on a yellow mounting, nor will a picture with a broad expanse of blue sky look well on a light blue mounting. In such cases the picture loses definition because, from a short distance away, it tends to merge with the mounting itself. When in doubt as to the precise color to use, the teacher will do well to experiment until he gets a desirable effect.

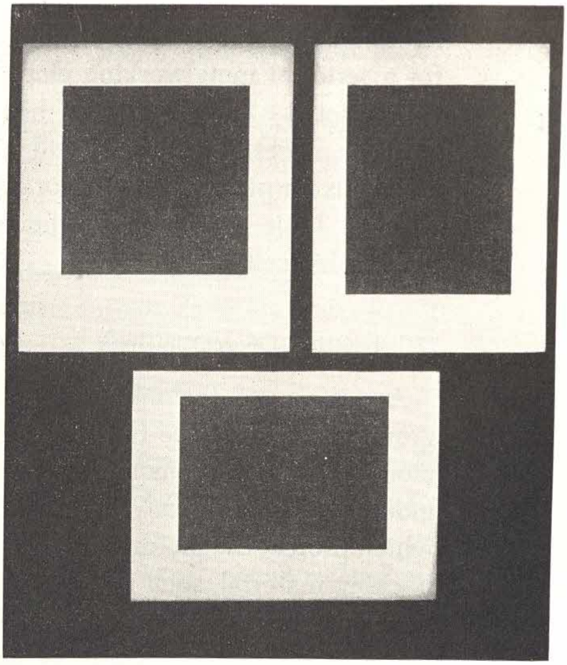

Fig. 4.12. The width of margin depends on the shape of the picture or design. (From Nicholas, Trilling, Lee, and Stephan, *Art for Young America*, Charles A. Bennett Co., Inc.)

In general, neutral tones for mountings are more pleasing than "loud" or brilliant colors, although there are notable exceptions. Thus bright red or green mountings look well with Christmas pictures, orange mountings with Halloween subjects, and gay pastel mountings with Easter decorations. The idea here is to emphasize a gay and festive spirit; the purpose of these mountings may be primarily decorative, which is entirely appropriate in such cases. As a general rule, however, where informational purposes predominate, the above principles should apply.

Frequently an ink border will help to set off the picture on the mounting. A similar effect is obtained by inserting, immediately behind the picture, a sheet of mounting paper slightly larger than the picture and of a different color from that used for the mounting itself. This sheet will extend slightly beyond the edges of the picture and thus provide a border in a contrasting color.

3. *Use mounting materials appropriate to the picture subject.* Teachers frequently find colored drawing paper to be the most readily available material for picture mountings; it is also inexpensive. But once the teacher gets the feel and pleasure of attractive mountings, there is no reason why he should not give his ingenuity free play and experiment with a variety of textures, materials, and colors in obtaining desired effects. A shop teacher, for example, may find a metallic background ideal for a series of metalworking pictures; a background of old maps may be very effective for a series of historical illustrations; fabrics of various kinds or pieces of wallpaper will make effective and interesting mounting materials for pictures on interior decoration. The possibilities are virtually without limit except as to the time, interest, and enthusiasm of the teacher himself.

TECHNIQUES OF MOUNTING

A variety of techniques for mounting pictures on selected backgrounds are available to the teacher. There are dry mountings, floating mounts, temporary mountings with thumbtacks, etc., and such special mounts as acetate envelopes and transparent plastic gummed sheets which protect the picture surfaces.[2] For permanent mountings a fairly stiff backing material, such as Bristol board or heavy cardboard, is desirable. Such material does not deteriorate readily and provides a firm backing for a flat picture which is to be used again and again.

Temporary Mountings

RUBBER CEMENT. One of the simplest methods of mounting is to coat the back of a picture with rubber cement and lay it on the mounting surface. Rubber cement comes in convenient tubes or jars, is not messy, and has the added virtue of being readily removable. Should some of the cement squeeze out around the edges when a picture is pressed down on the mounting surface, the excess can be rubbed off with the fingers. The cement does not dry completely for a long period of time nor does it tend to soak into the paper surface. This means that a picture can be peeled off of a mounting whenever desired. A more permanent mount is obtained by coating both the picture and the mounting and allowing the two surfaces to "set" for a minute or two before putting them together.

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[2] See pp. 535–536 for sources of mounting and display materials for flat pictures.

Rubber cement can also be used on the edges of the back of a picture; it will hold very well if the picture is not on heavy stock which will tend to curl. Dabbing on liquid paste or glue at the corners is a well-known method of "pasting" pictures. Rubber cement is also effective when used only on the corners if the picture is on magazine or lighter-weight paper stock.

PINS AND THUMBTACKS. Everyone is familiar with the bulletin board display that is studded with shiny-headed thumbtacks. Although thumbtacks are used in mounting pictures, the resulting appearance is poor. A much better effect is obtained by using straight pins, a device that is familiar to many art teachers; the pins cannot be noticed from a few feet away. Pins are usually used only on bulletin boards, because a mounting is rarely heavy enough to hold a pin. Pin mounting is useful when time does not permit more satisfactory methods to be used.

GUMMED TAPES. Another relatively easy way of mounting flat pictures is to run gummed cellophane tape around the edges of the picture and overlap it onto the mounting surface. Considerable care is necessary in applying the tape because, once applied, it sticks fast to any surface and is very difficult to remove without damaging the picture or the mounting, or both. Cellophane tape also comes in colors which may be used occasionally with striking effect.

A type of artists' tape called *passe partout* may be used as cellophane tape is used. *Passe partout* comes in such colors as dull red, green, medium brown, blue, white, and black, and can accordingly be used to make interesting borders where these colors are appropriate. As with cellophane tape, considerable care is necessary in getting the tape placed properly the first time. It is also important that the corners be neat and square.

Permanent Mountings

FLOATING. In floating, the entire back of the picture is coated evenly with a layer of paste, glue, or liquid cement. The picture is then placed on the mounting and carefully smoothed down. Pictures so mounted should be put in a press or under a pile of books until they are dry in order to assure a good bond at every point and to minimize the curling effect. Only enough adhesive should be used to coat the picture very lightly because any excess around the edges is difficult to remove without impairing the appearance.

DRY MOUNTING. Dry mounting requires a special tissue material that is affixed by means of a hot iron. A neat, professional-looking mounting job can be done with a little practice.

The dry-mount tissue can be obtained in rolls or sheets from photographic supply stores. Kraft board or some other type of cardboard is very satisfactory for the mounting. The other materials required are plain white paper, clear flat lacquer and thinner, and a sprayer like that used for insecticides or paint.

In using the dry-mounting process, a piece of the dry-mount tissue is trimmed to picture size and put on the back of the picture. The picture and the tissue backing are then placed on the mounting material and covered with a piece of plain white paper. An iron heated to about 300 degrees is applied firmly, the picture being literally ironed onto the mounting. The mounted picture is then sprayed with clear flat lacquer to protect it.[3]

PLASTIC MOUNTING. A commercial type of mounting which seals the picture in a clear, nonglossy plastic covering has marked advantages. The picture is permanently protected from dirt, moisture, and tearing. The plastic material is flexible, light in weight, and sufficiently strong to prevent damage from continuous handling.

The use of a plastic mounting process makes feasible the circulation of sets of pictures from school to school within a system. The audio-visual department of the Los Angeles City Schools, for example, has plastic mounting equipment for this purpose. Not all pictures need a permanent mounting of this nature, but it is well suited for those that are to be circulated or are irreplaceable.

The above methods are the ones most commonly used for mounting pictures. In determining which method to use, the teacher should select the one that is most practical in terms of time, effort, and utility. Pictures should be mounted if they are to have maximum effectiveness as teaching tools. A few well-selected and well-mounted pictures can provide rich sources of information in an attractive and interesting form. Specific suggestions for using pictures are given in the following section.

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[3] For a detailed description of the dry-mount process, see Elizabeth Goudy Noel and Paul J. Leonard, *Foundations for Teacher Education in Audio-Visual Instruction*, American Council on Education, Washington, 1947, pp. 33–34.

PRINCIPLES OF THE EFFECTIVE USE OF FLAT PICTURES

1. *Use pictures for specific purposes.* Clear-cut purposes are important in using pictures as well as in selecting them. Having chosen a certain picture to illustrate a particular point, you naturally keep that point clearly in mind as you use the picture with a class. A good picture frequently contains much information, perhaps much more than you wish to discuss. Having specific purposes in mind, you are in a position to direct the pupils' attention to the most important items in the lesson.

If today's lesson on colonial life in New England is aimed at giving an understanding of the colonists' food, clothing, and shelter, you direct attention specifically to these items in the pictures you use. If the objective is a comparison of living conditions in the northern, middle, and southern colonies, groups of pictures providing these comparisons should be utilized. In one instance you may point out the comparisons yourself; in another you may let your pupils discover them (Fig. 4.13). In either case you need to know clearly what you wish to accomplish. In other words, the objectives determine both which pictures you use and how you use them.

2. *Integrate pictures in the lesson.* Effective use of pictures in teaching requires that they be treated as integral parts of the lesson. Generally speaking, if pictures are to be used at all, something definite must be done with them. A purely casual reference to a picture implies to the pupil that it is of minor importance. Brief or limited reference to a bulletin board display gives a similar impression. For pictures to be of real worth in a lesson, they must contribute to the pupils' understanding and be used in such a way as to indicate their importance.

3. *Use few rather than many pictures.* A third principle in the effective utilization of pictures is that they be used sparingly. A few well-selected pictures usually accomplish far more than twice as many carelessly chosen pictures do. All too frequently the bulletin board is so filled with materials that nothing stands out. In this case the teacher may be working on the fallacious assumption that if one picture is good, two will be twice as good; accordingly he provides so many illustrations that his pupils are confronted with a mass of interesting but unorganized visual

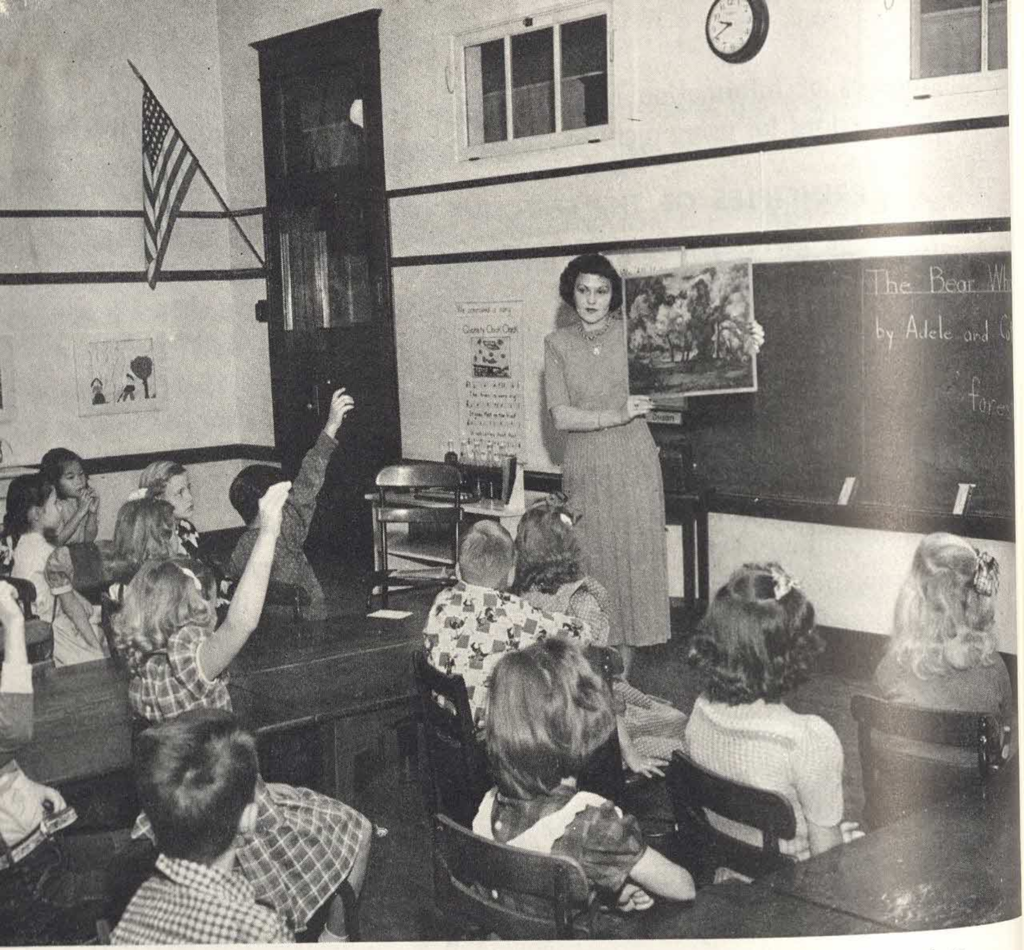

Fig. 4.13. Large pictures may be used to stimulate class discussion. They must be large enough to be visible to all the children. (Courtesy of Los Angeles City Schools.)

impressions. Hoban tells about the police chief who sent neighboring communities six pictures of a criminal who had escaped from a small-town jail. Within a short time numerous responses came in, including a telegram from a neighboring chief of police which read, "Have arrested five of the men; expect to have the sixth within a few hours."[4]

The principle here simply involves focusing attention on key ideas. Once these ideas have been well established, additional illustrations may be valuable for enlarging on the initial concepts. A picture of a turret lathe may be excellent for familiarizing the shop student with its important parts and levers. The instructor will then wish to expand these initial concepts by means of a series of pictures showing the step-by-step process of setting up a job. As a good shop teacher he will focus his students' attention by showing one picture in the series at a time. Later he may put the entire series where the students can consult it as needed.

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[4] Charles Hoban, Charles Hoban, Jr., and Samuel B. Zisman, *Visualizing the Curriculum*, Dryden, New York, 1937, p. 186.

TECHNIQUES OF PRESENTING FLAT PICTURES IN TEACHING

BULLETIN BOARDS

The bulletin board, or tackboard[5] (a term that is coming into frequent use among school architects), is a familiar medium for displaying flat pictures. It is also one of the most effective methods of using these pictures, particularly those of sufficient size to be seen across the classroom. Given a little planning, a title to indicate its purpose, and an interesting arrangement, the teacher-prepared bulletin board can arouse curiosity, enliven interest, and impart useful information.

Similarly, a coöperatively developed bulletin board can provide stimulating learning experiences for pupils. It can be used to illustrate steps or phases of a unit as they are developed by the class and the teacher together. It can be important as a summary or review device. In short, the tackboard can be a versatile and valuable teaching tool. All too often, however, its possibilities are not appreciated. The following apt lines by an anonymous poet will bring a smile of recognition to altogether too many teachers: "The announcements on our bulletin board grow tattered, worn and brown, for everybody puts the bulletins up, but nobody takes 'em down."

Importance of Space

The most common fault with bulletin board displays is the fact that they are typically overcrowded with materials. A good rule to follow is to have a generous amount of empty space—as much as is covered by the pictures, and more if possible. Here again a few well-selected pictures will be far more effective than a larger number. The reason for this is simple and logical. Attention is more readily captured and held when there is a well-defined center of interest and good contrast. One way of providing contrast is through the liberal use of space (see Fig. 4.14).

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[5] Chap. 6 is given over to the subject of tackboards.

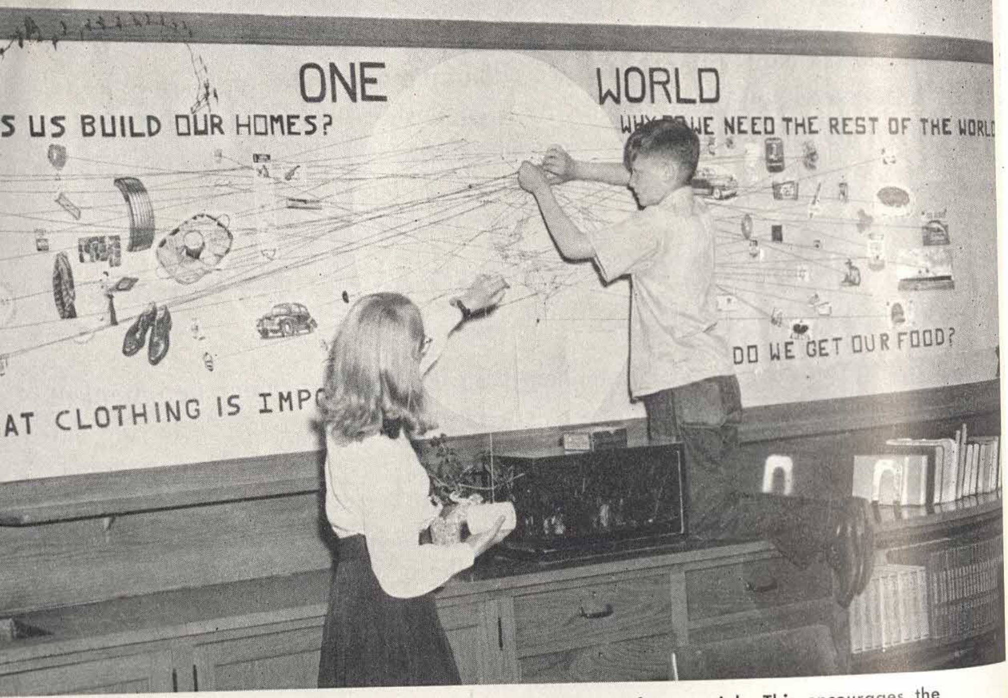
ONE
WORLD
S US BUILD OUR HOMES?
WE NEED THE REST OF THE WORL
DO WE GET OUR FOOD?
AT CLOTHING IS IMP

Fig. 4.14. The effective bulletin board provides generous space for materials. This encourages the pupil to express his ideas freely. (Courtesy of Janesville, Wisconsin, Public Schools.)

Arrangement

Arrangement is another important factor in catching the eye and creating interest. James Schwalbach, originator of the University of Wisconsin School of the Air program, "Let's Draw," has developed a series of principles applicable to pictures, bulletin boards, and other types of display. He says that to attract attention a *spot* or center of interest is needed (Fig. 4.15). Any picture display or graphic representation is made up of a number of areas of interest, however, and thus the question to be considered in preparing layouts becomes one of *competing spots*. The following general principles based on psychological and physiological factors concerning how the eye reacts to seeing patterns are applicable here: (1) Attention is attracted normally to the most *contrasty* point in a given area; (2) attention is attracted to the *larger* of two or more competing spots; (3) attention is attracted to an *irregular* spot in a group of similar shapes; (4) attention is attracted to the spot *nearest the margin* in a group of otherwise similar spots.

These four principles likewise apply when lines rather than spots are being considered. It is apparent that a series of spots—for example, a

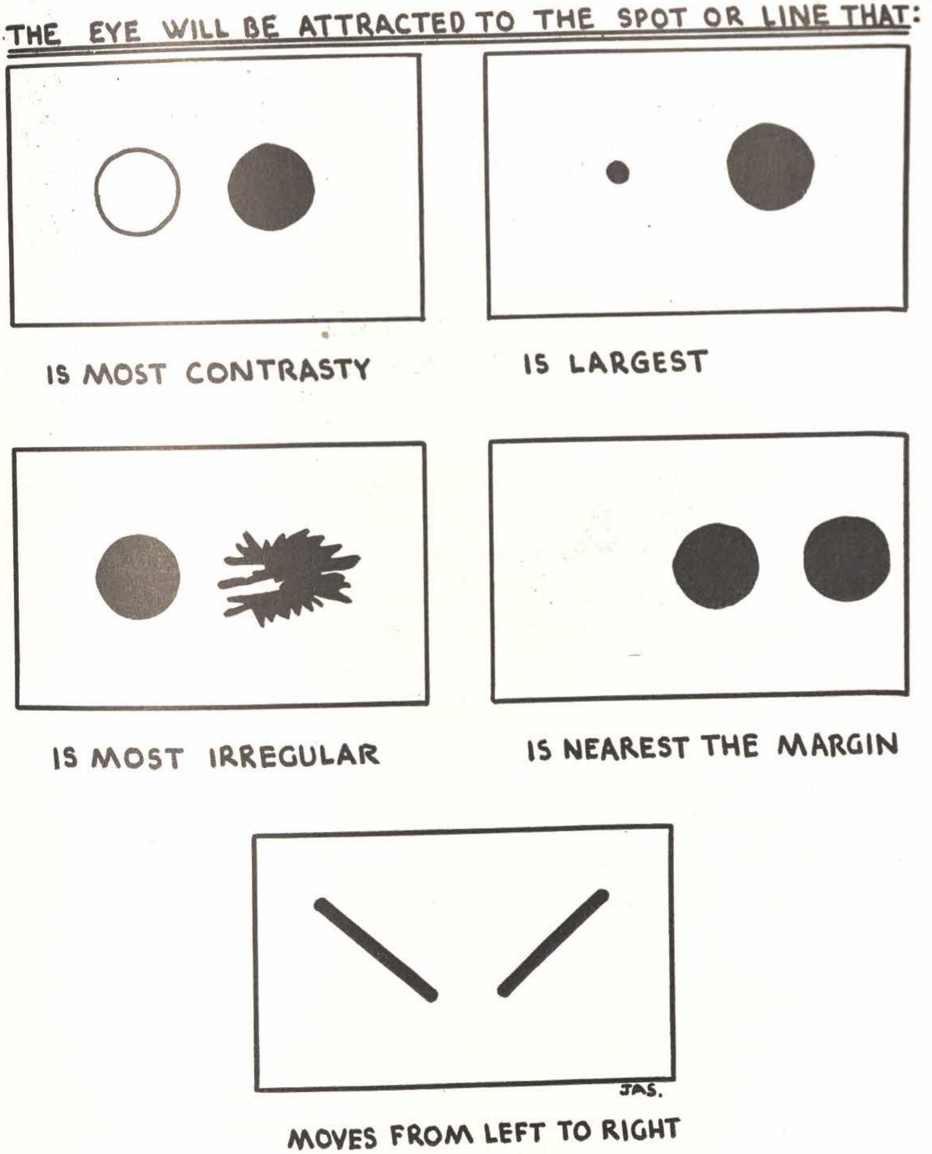

Fig. 4.15. (Prepared by James Schwalbach.)

series of like-sized pictures on a bulletin board—tends to become a line in the viewer's mind. Thus it is important to observe a fifth principle: (5) A line that moves from *left* to *right* attracts more attention than one that moves from right to left. This of course is based on the existing approach to eye movements in reading.

Use of Color

It is obvious to even the most casual observer that color has an important part in displays and pictures. Thus when color is a factor, a variety of simple but fundamental principles should be observed—for example, the desirability of using on one bulletin board only colors which harmonize well or, if clashing colors must be used, of keeping them as far apart as possible. The teacher will readily recognize when color combinations are pleasing or otherwise. From the standpoint of gaining attention, however, a sixth principle applies: (6) Warm colors (reds, browns, and their combinations) tend to attract more attention than cool colors (blues and greens).

The above brief discussion indicates clearly that a number of aesthetic considerations are involved in the preparation of displays, bulletin boards, and other graphic aids to learning. It also becomes apparent, after a little thought, that in a practical situation a teacher will be faced with the necessity of ignoring or minimizing one or more of these principles because of the materials available, the relative importance of such factors as pupil participation, and the purposes for which the display is prepared. These are matters in which the teacher's own judgment will have to prevail. By and large, however, and within the framework of fundamental teaching and learning considerations, the intelligent application of the above principles in the preparation and display of materials in the classroom will materially enhance their effectiveness as teaching aids.

OPAQUE PROJECTION

Few pictures lend themselves readily to direct observation by an entire class at one time because of their size. Pictures which cannot be seen easily from the back row can be projected by an opaque projector so that all may see them with ease. Whereas the older opaque projectors take pictures no larger than 6″ x 6″, the newer models take illustrations up to 8½″ x 11″ and provide 1000-watt illumination. The increase in size and illumination reduces considerably the major difficulties involved in using the older type of projectors. Although some darkening of the room is necessary even with the newer projectors, it does not have to be complete. The larger opening permits far greater flexibility in the choice of pictures to be projected. Mounted pictures can be placed directly on the platen; "frames," "mats," or "magnets" are provided for loose pictures and for illustrations in books and magazines. One projector has a blower system that holds loose pictures firmly on the platen; this works like a continuous belt operated by a hand crank.

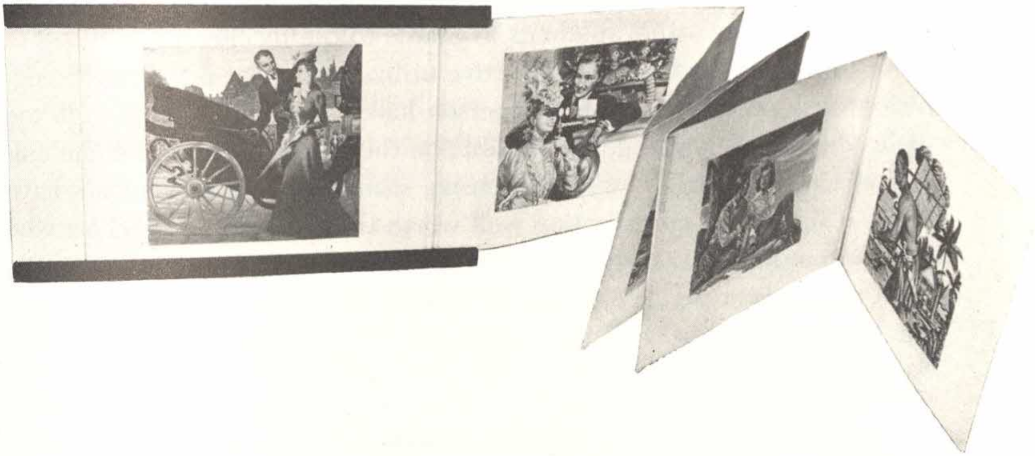

Fig. 4.16. Strips of picture can be easily run through a slot in an opaque projector. (Photo by Univ. of Wisconsin Photographic Laboratory.)

When a series of pictures of similar size is to be shown, a convenient method is to mount each one on a piece of light cardboard like that used in Manila folders, fasten the pieces together with cellophane tape, and draw them through the projector. A slot arrangement like that shown in Fig. 4.16 permits easier operation. Slots can be made of cardboard; they are also commercially available with rolls of paper of correct size. The series of pictures may be "accordion" folded and easily stored when not in use.

INDIVIDUAL STUDY

The value of flat pictures in teaching lies not only in their lifelike realism, but also in the possibility for individual study at the learner's own rate and interest level. Suppose, for example, that a series of pictures on life in India has been shown in the opaque projector and then arranged in a bulletin board display for an intermediate-grade social studies class. Once the class has viewed and discussed the pictures, further and more intensive study of these and other pictures by individual pupils may well be made the basis of committee reports and individual projects.

In this procedure, pictures come to have an integrated place in teaching and learning methods. They are recognized by pupils as sources of information along with books, films, slides, maps, field trips, and other media, each of them functioning in the specific area where it is more effective than any other methods available to the teacher.

An important factor in the effective utilization of flat pictures is recognition of what happens when a person looks at a picture. Although too little scientific knowledge is available on the whole process of communication via pictures, Buswell's extensive studies of eye movements have made a significant contribution well worth the attention of teachers who are contemplating pictures as teaching materials. His studies were made with particular reference to fine art, but his conclusions seem to be valid for informational as well as appreciational objectives in picture study. According to him:

> Two general inferences in regard to teaching children may be drawn from study of eye movements. First, the teacher must expect that in studying a new picture the pattern of perception at first will resemble that of a general survey of the picture as a whole. Without some directional teaching, this general survey is likely to be so satisfying to the pupil that he will make no further attempt to study the picture and will be satisfied to say that he has seen that picture. There is little evidence to show that any real taste for art follows this type of superficial looking at pictures.
>
> A second inference to be drawn is that if the child's attention can be centered sufficiently on certain aspects of the picture to induce him to examine those parts in detail, there may result an interest in the picture which will become so compelling that the child will study that picture until he can call it really his own.[6]

There are several implications for teachers in the Buswell study. First, the teacher should not assume that pupils will secure the important information contained in a picture simply by exposing them to it.

Second, the teacher must do more than merely show pictures to a class. He must bring out specific points of importance about each picture, point up things to look for, and make sure that these things are seen and appreciated. These objectives may be accomplished in class discussion or by assigning specific questions.

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[6] Guy T. Buswell, "Learning to Look at Pictures," *Progressive Education*, October, 1936, p. 422. See also his *How People Look at Pictures*, Univ. of Chicago Press, Chicago, 1935, p. 198.

Third, it is necessary, for successful individual study, to develop among pupils a habit of careful scrutiny of pictures, so that they will ascertain important facts concerning the content as well as the general impression a picture gives and an appreciation of the aesthetic impact of a picture as a whole.

Fourth, as with other media of communication, it stands to reason that there will be wide variations in individual ability to read pictures effectively, even though these differences will not be as marked as in the case of the printed word.

STEREOGRAPHS

Another highly effective form in which pictures may be observed by individual pupils is the stereograph, the most vivid and realistic picture of all. While for all practical purposes the stereograph is as yet used only by individuals, its unique characteristics require that it be treated separately in any discussion of picture study.

The stereograph consists of two pictures of the same scene taken from slightly different angles with a camera that has two lenses set as far apart as a person's eyes. The two pictures are observed separately but simultaneously by the left and right eyes by means of a device called a stereoscope. The visual representation thus made possible has a three-dimensional effect that is highly realistic. If the purpose of using pictures in teaching is to bring reality into the classroom, no classroom should be without stereographs and stereoscopes with which to view them, for nothing in the picture medium has proved as successful in achieving realism as the stereo.

The stereograph idea is over a century old. Charles Wheatstone actually invented the device in 1838, but it was not until the late 1800's that it was perfected and took the country by storm. Few were the homes that did not have a set of stereographs with a viewer or two, and virtually all the schools were provided with viewing equipment and numerous stereographs.

The idea did not remain as popular as it deserved, however, and the use of stereos in schools and elsewhere declined steadily between the two World Wars. Early in World War II the United States armed forces introduced an improved and simplified version of the stereoscope that used 16 mm. transparencies in both color and black and white for individual study of such subjects as gunnery and aircraft recognition. These were so effective that after the war the improved stereos again became popular for use in many school systems. Several pairs of transparencies are mounted on a disk which is inserted in a small plastic viewer; the picture is shifted by pushing a lever (Fig. 4.17). A marked advantage of the newer stereograph is that it can and does utilize color very inexpensively.

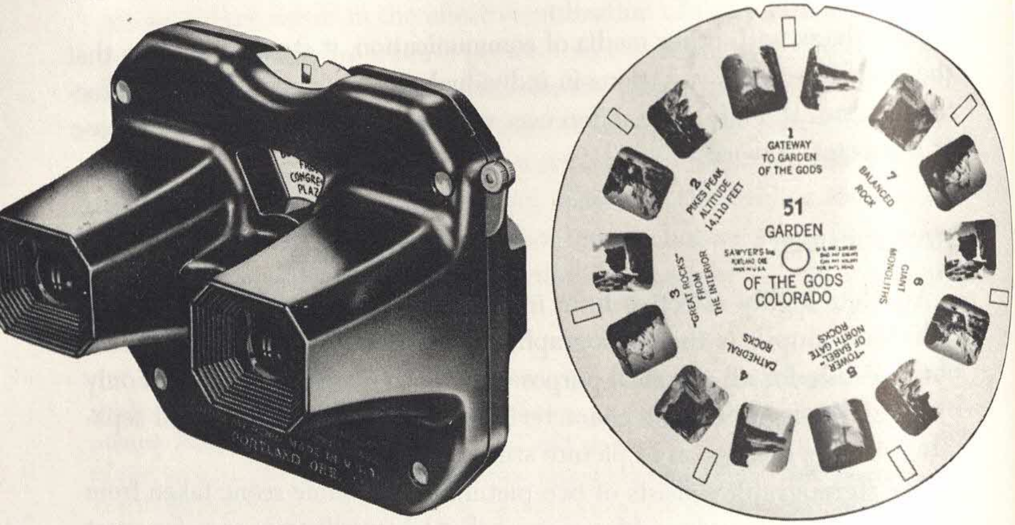
1 GATEWAY TO GARDEN OF THE GODS
2 PIKES PEAK ALTITUDE 14,110 FEET
51
GARDEN
OF THE GODS
COLORADO
SAWYER'S Inc.
3 "GREAT ROCKS" FROM THE INTERIOR
4 CATHEDRAL ROCKS
5 "TOWER OF BABEL" NORTH GATE ROCKS
6 GIANT MONOLITHS
7 BALANCED ROCK
PORTLAND ORE.

Fig. 4.17. The improved stereoscope uses 16 mm. transparencies on disks. (Courtesy of Sawyer's, Inc.)

Technicians have been attempting for years to discover a practical means of projecting stereograph images for group use. In the several fairly successful methods now available, special viewers or spectacles must be used by each member of the audience. When this and certain other technical difficulties are removed, stereoscopic projection for the class as a unit will probably assume a place of importance in the schoolroom. For the present, the stereograph and stereoscope are the only means of presenting scenes in the lifelike realism of three dimensions. Accordingly, they have a significant part to play in the individual study of picture materials at all curricular levels.

SUMMARY

Flat pictures are a highly important phase of audio-visual materials. They are inexpensive, readily available to all teachers, and highly effective as a means of communicating ideas.

The selection of good flat pictures for teaching involves consideration of their artistic quality, clarity, truthfulness, interest, suitability for teaching purposes, and size.

Good pictures should be mounted. Good mounting not only preserves the picture but enhances its effectiveness. Teachers and older pupils can mount pictures effectively by applying simple principles governing such factors as generous margins and care in the use of color. Several methods are available for making either temporary or permanent mounts.

Good classroom procedure with flat pictures involves the selection of pictures in terms of specific purposes, their integrated use in the lesson, and the use of few rather than many pictures. Bulletin boards are an excellent means of displaying pictures if plenty of space, good arrangement, and color balance are provided. Opaque projection is a valuable method of presenting pictures for group work. Flat pictures can also be studied by individual pupils either mounted or as stereographic views.

The effective use of flat pictures requires teacher direction. The instructor who recognizes the importance of the pupil's background, of specific points to look for, and of individual differences in ability to interpret pictures will secure the most satisfactory results from their use.

Suggested Activities

1. Have each student bring in several examples of good flat pictures in the respective subject-matter fields. Have the class evaluate a selection of these pictures in terms of the principles discussed in this chapter.
2. Have members of the class mount several flat pictures of different sizes, shapes, and colors. Discuss the effectiveness of the mounting used and suggest means of improvement.
3. Assign a committee to prepare a bulletin board display for the class on the subject "What Is a Good Picture?" Have the class evaluate the display as an effective bulletin board (a) from the display standpoint, and (b) from the standpoint of its teaching values.
4. Have a committee prepare an annotated and classified list of good sources of free or inexpensive flat picture materials for duplication and distribution to class members.

5. Have each pupil bring in a current issue of *Life, Look,* or a similar publication for use in a class discussion of the qualities of good photographs. Draw up a list of elementary suggestions on how to take good pictures.

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INSTITUTE OF EDUCATION FOR WOMEN
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CALCUTTA-27

5. Graphics

Webster defines graphics as the art or science of drawing—especially mechanical drawing. As applied to visual materials, however, the term "graphics" or "graphic materials" has a broader meaning than drawing alone. The original Greek *graphikos* included painting as well as drawing and the verb *graphein* means to write as well as to represent by means of lines. Furthermore, when used as an adjective, "graphic" carries with it the sense of vivid clarity, forceful description, and effective presentation.

Taken together, the above definitions combine readily into a practical concept of graphics as *materials which communicate facts and ideas clearly and forcibly through a combination of drawings, words, and pictures.* The drawings may take such forms as diagrams, sketches, or graphs. Words (and numbers) may be used as titles and explanatory comment on graphs, charts, diagrams, and posters, and in the balloons of cartoons and comic strips. Sketches, symbols, and even photographs may be used in graphic materials to convey meaning to facts, concepts, and ideas which by their nature lend themselves to graphic presentation.

The instructional values of graphic materials lie generally in their capacity to attract attention and to convey certain types of information readily. Their particular role is to present facts and ideas in condensed, summarized form. A biology chart on cell division may outline the complete process of mitosis. A diagram of office organization may show quickly the channels of responsibility and departmental function.

CATEGORIES OF GRAPHIC MATERIALS

The graphic materials discussed in this chapter are as follows:

1. Charts
2. Diagrams
3. Graphs
4. Posters
5. Cartoons
6. Comics[1]

This list should not be regarded as rigidly fixed. Some diagrams may be simple, easily followed sketches made on the back of an envelope; others are intricate interpretations of complex functions or processes. Both are diagrams, but clearly the envelope sketch is far less abstract. Likewise, while a cartoon in *Boys Life* registers with Junior in a flash, a cartoon in *The New Yorker* may well be over his head.

As a rule, graphs and diagrams are more abstract than other types of graphic material because they depend largely upon symbols. Charts usually contain some pictorial material which helps to convey meaning. Posters, cartoons, and comics normally depend heavily on visualizations of facts or ideas already somewhat familiar to the observer. We shall consider here the essential characteristics, uses, and sources of charts, diagrams, graphs, posters, cartoons, and comics.[2]

CHARTS

Usage has made "charts" a general term inclusive of a variety of such graphic presentations as maps, graphs, pictures, diagrams, posters, and even cartoons. For purposes of clarity, however, it is desirable to consider charts as a distinctive medium of visualization with certain attributes of their own. Accordingly, charts may be defined as *combinations of graphic and pictorial media designed for the orderly and logical visualizing of*

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[1] Maps and globes are sometimes included in lists of graphic materials. They are omitted here, however, because they are discussed specifically in chap. 7.

[2] See pp. 535–536 and 545–547 for sources of graphic materials and supplies.

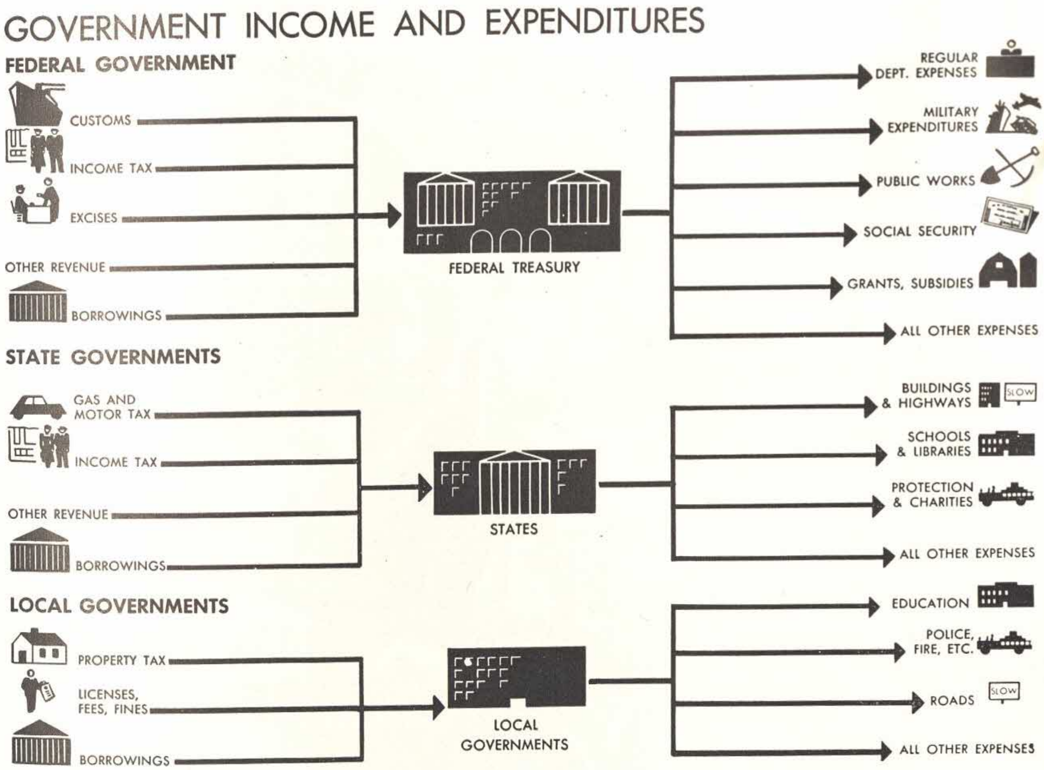


Fig. 5.1. Charts usually emphasize key ideas and relationships. (Courtesy of Pictograph Corporation.)

relationships between key facts or ideas. The particular role of the chart is always to show relationships such as comparisons, relative amounts, developments, processes, classification, and organization.

"What is the relationship between the mayor and the chief of police?"

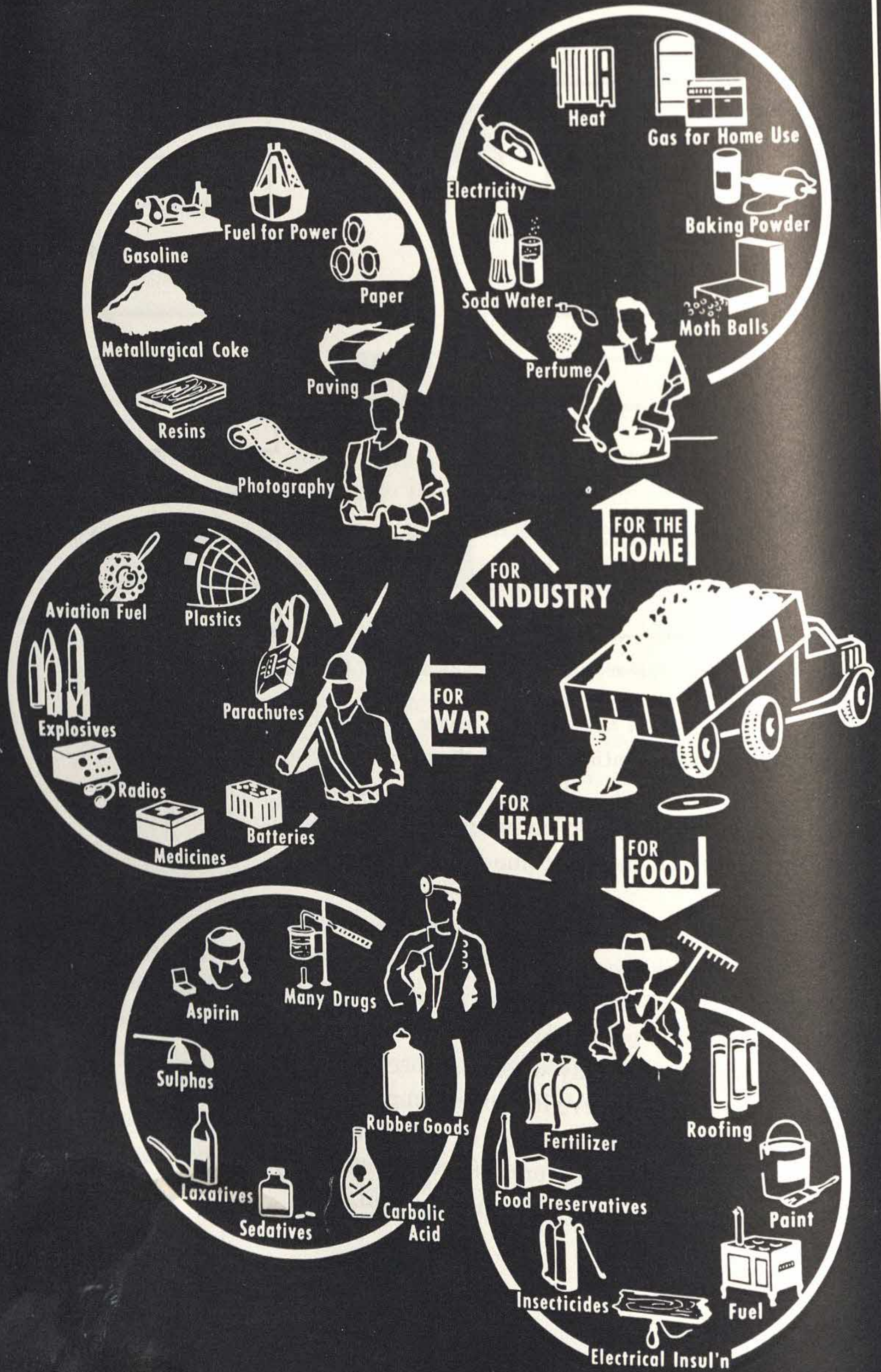
"Where does the money come from to finance the operation of our schools?"

"When is a bill referred to the House Rules Committee?"

Such questions as these have a familiar ring to high-school teachers of civics or citizenship—and likewise to many of their perplexed pupils. One of the things a good teacher knows is that concepts such as these can be learned more readily when visualized on charts or diagrams.

The chalkboard may serve to convey simple relationships such as those between the mayor and the chief of police, but to show the principal types of income and expenditures of several units of government a chart like that in Fig. 5.1 is likely to be more helpful.

200,000 PRODUCTS NOW COME FROM COAL



SOURCE: BITUMINOUS COAL INSTITUTE

Geer, Du Bois Associates

TYPES OF CHARTS

There are many types of charts; among them are classification charts, genealogy charts, flow charts, relationship charts, tabulation charts, and chronology charts.[3] The charts most commonly used in teaching are genealogy or tree charts, flow charts, and chronology or tabular charts.

Tree Chart

As its name suggests, the *tree* chart is developed from a base composed of several "roots" which lead into a single trunk. The branches, in turn, represent developments and relationships. A good example is a genealogy chart in which two individuals are the roots from which a family "tree" grows. This type of chart is useful in showing developments resulting from a combination of major factors. For example, a tree chart is suitable for showing the many by-products obtainable from coal (Fig. 5.2). It is likewise effective in showing how iron ore, limestone, coke, and various chemicals may be combined to produce a variety of types of steel.

Sometimes a reverse form of the tree chart is useful in showing how a great variety of elements are combined to form one important product. This type of chart is known as a *stream* chart. It can be used to illustrate the interdependence of an industrial nation with other countries; thus our automobile industry requires chrome from South Africa, etc. (see Fig. 5.3).

Flow Chart

The organization of a student council or a unit of government, the development of a manufacturing process, or the steps whereby a bill becomes a law can be shown to advantage in a *flow* or organization chart. This chart is well suited to showing functional relationships and is used widely in industry and government for that purpose (see Fig. 5.4).

Tabular Chart

Sequence relationships such as those in a historical time line or a timetable can be shown on a *tabular* chart. One of the unique values of the

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[3] See Willard C. Brinton, *Graphic Presentation,* Brinton Associates, New York, 1939, chaps. 3–8, 31, for descriptions and uses of the types of charts listed.

Fig. 5.2. A modified tree chart shows the products obtainable from coal by carbonization in the modern by-product coke oven. (Courtesy of Bituminous Coal Institute.)

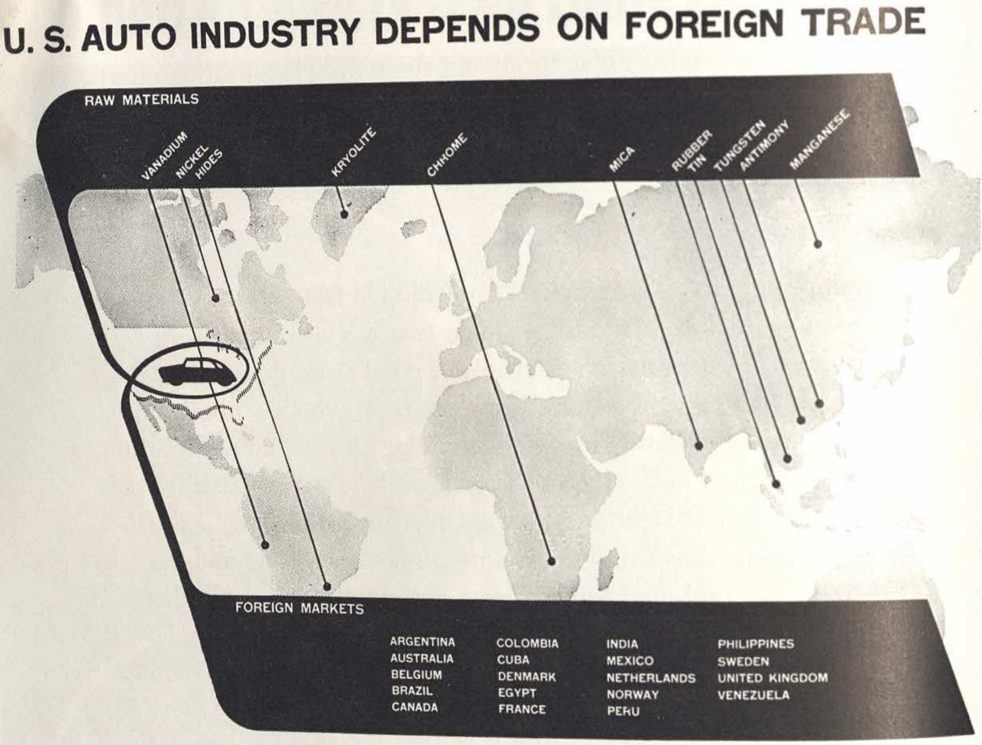

Fig. 5.3. A stream chart illustrates dependence on foreign trade. (U.S. Department of State.)

tabular chart is its ability to show time relationships. Variations of this form of chart include tables of information such as arguments for and against a bond issue, nations participating in the United Nations, etc.

DIAGRAMS

A diagram is a *simplified drawing designed to show interrelationships primarily by means of lines and symbols*. Even more than the chart, a good diagram is highly simplified; only the most essential elements are shown. It is likely to be more difficult to read than a chart because it may be only a line, a bare outline of a real object, or a cross-sectional sketch of an object like a cylinder.

A typical diagram is shown in Fig. 5.5. Put yourself in the pupils' place as you attempt to analyze it. Does it seem somewhat difficult to understand? If so, this should indicate the need for careful planning in using diagrams with your classes.

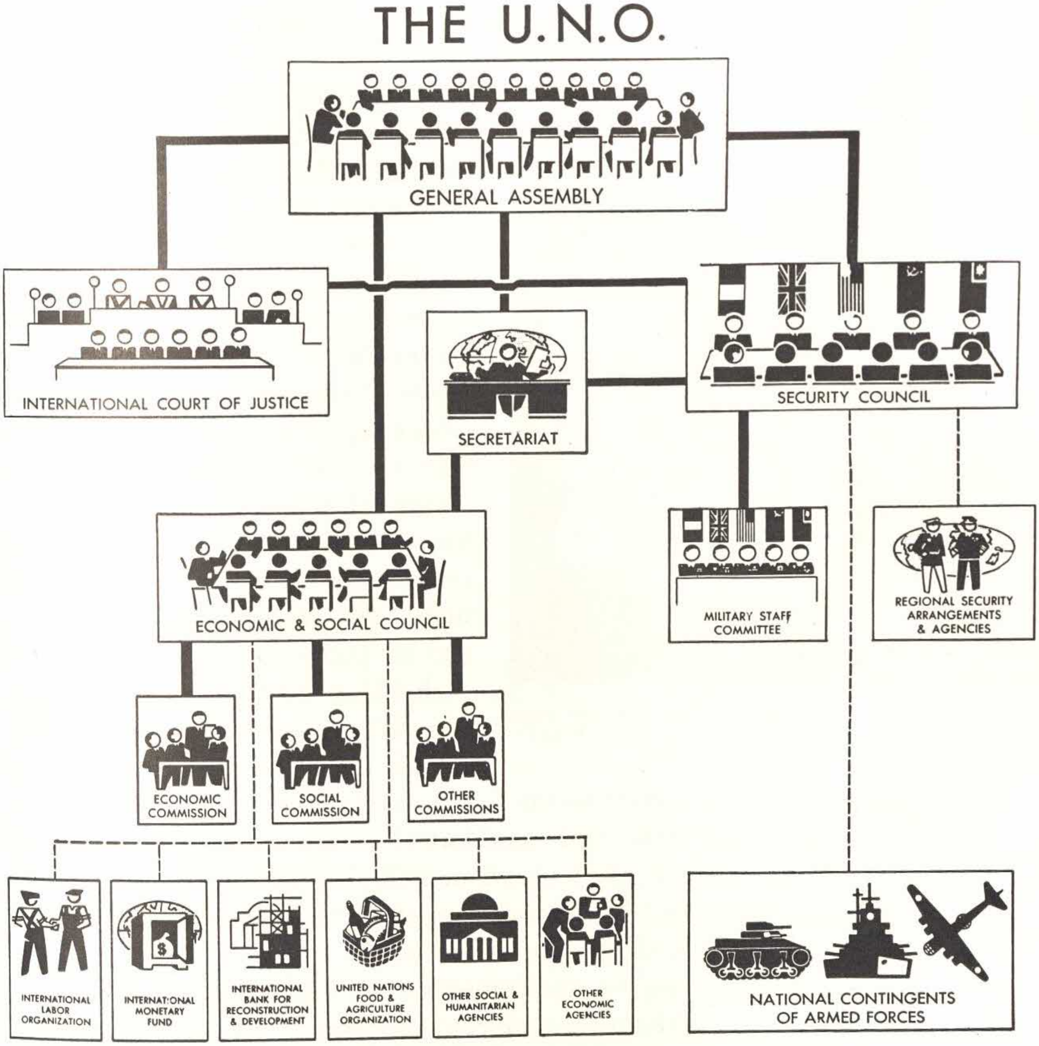
THE U.N.O.
GENERAL ASSEMBLY
INTERNATIONAL COURT OF JUSTICE
SECRETARIAT
SECURITY COUNCIL
ECONOMIC & SOCIAL COUNCIL
MILITARY STAFF COMMITTEE
REGIONAL SECURITY ARRANGEMENTS & AGENCIES
ECONOMIC COMMISSION
SOCIAL COMMISSION
OTHER COMMISSIONS
INTERNATIONAL LABOR ORGANIZATION
INTERNATIONAL MONETARY FUND
INTERNATIONAL BANK FOR RECONSTRUCTION & DEVELOPMENT
UNITED NATIONS FOOD & AGRICULTURE ORGANIZATION
OTHER SOCIAL & HUMANITARIAN AGENCIES
OTHER ECONOMIC AGENCIES
NATIONAL CONTINGENTS OF ARMED FORCES

Fig. 5.4. Lines of responsibility and organization are shown on a flow chart to visualize the complex functions of the U.N.O. (Courtesy of Pictograph Corporation.)

USE OF DIAGRAMS

While charts are highly condensed visual summaries of facts and ideas, diagrams are even more condensed and rely heavily on symbolic means of representing ideas. In order to be effective, both must concentrate on key ideas and dispense with unessential details. Understanding information or ideas presented in diagrammatic form usually requires a background of first-hand experience. Most of us are unable to comprehend a schematic diagram of a television receiver because we lack the knowledge necessary to interpret it. What does this suggest with reference to the use of diagrammatic materials in teaching? First of all, it means that before using a diagram with a class, the teacher must make sure that his pupils have the necessary background to understand it.

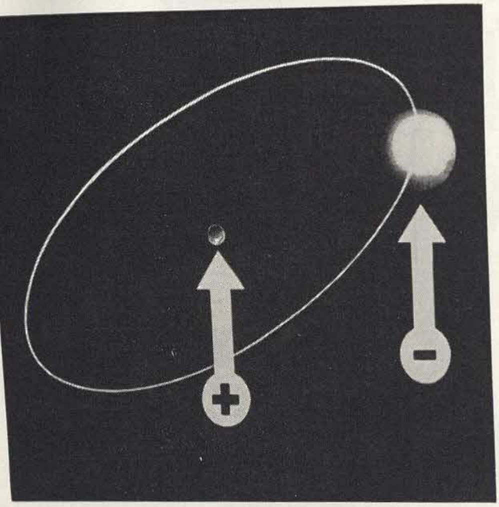

Fig. 5.5. Diagram of the hydrogen atom. (Courtesy of Encyclopædia Britannica Films.)

Little research has been done on the ability of children to read diagrammatic materials. A series of four studies by Malter with elementary-school pupils revealed that most children of elementary-school age have considerable difficulty in reading cross sections, process diagrams, and conventionalized diagrammatic symbols, such as diagrams of a gasoline engine and lift pump.[4] A follow-up study revealed that the addition of clarifying materials such as photographs of the actual object aided the children greatly in reading a cross section.[5] A second follow-up study showed that when simple directions such as "Start Here and Follow Arrows" were added to a process diagram of a flour mill, the children were materially helped in interpreting the diagram correctly, although there was evidence of a need for still further improvement in it.[6]

Malter's studies support the principle that *diagrams and similar materials of an abstract character require careful foundation work before they can be used efficiently with a class of pupils.* It follows that diagrammatic materials usually lend themselves better to summary and review than to introductory use in a lesson. As the teacher realizes, the interpretation of even such relatively concrete media as pictures depends heavily on the experience which the child can bring *to* a picture. A diagram of the steps in flour processing will have much additional meaning *after* the pupil has had an opportunity of going through a flour mill, seeing pictures of the several operations involved, and perhaps seeing a sound film describing the complete process.

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[4] Morton S. Malter, "Children's Ability to Read Diagrammatic Materials," *Elementary School Journal*, October, 1948, pp. 98–102.

[5] *Ibid.*

[6] *Ibid.*

A second principle is that *other appropriate audio-visual materials should be used with charts and diagrams to make them more understandable.* Such materials as pictures, slides, filmstrips, and motion-picture films all have as their basic function the clarification of significant concepts. While each audio-visual medium has certain unique advantages in a specific instance, the coördinated use of several types of audio-visual materials will yield the best results in most teaching situations. This is particularly true in the case of charts and diagrams because of their high degree of abstraction.

SOURCES OF CHARTS AND DIAGRAMS[7]

Industry and Government

Good charts and diagrams for teaching may be procured from many sources. Their wide use in industry suggests that the public relations and advertising departments of large corporations are one good source. State and federal government agencies frequently include excellent chart and diagrammatic materials in their publications. Another and particularly valuable source is textbook and reference material. An effective chart or diagram in a book or magazine can be used to advantage by projecting it in an opaque projector. If valuable enough to reproduce, it can be projected on the chalkboard or on a large sheet of paper and traced.

School Supply Companies

Commercially prepared teaching charts are well known among teachers in such subject areas as science, social studies, and the language arts. In many cases these charts are overcrowded but often they constitute the best material obtainable. A worth-while list of sources of good charts, diagrams, posters, and other graphic materials can usually be compiled by pooling information from any group of in-service teachers.

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[7] See pp. 545–547 for a list of sources of charts and diagrams.

"Homemade" Charts

Very good charts can also be made by teachers and pupils. Simple and effective charts can be prepared easily and without great artistic skill. Anyone who can draw a straight line with a yardstick and use a pair of scissors can, by following the few suggestions below regarding procedure and materials, make charts and diagrams that will help present key ideas. Many teachers have found it valuable to have some pupils plan and make graphic reports in place of writing a term paper.

Suggested Procedure

1. Lay out a plan for the chart on a sheet of paper 8½″ x 11″ or smaller.
2. Keep the chart simple. Remember that a good chart presents *one* idea or comparison. When it becomes intricate or complicated, it loses effectiveness. It should convey an impression at a glance.
3. Make the chart large enough to be seen *easily*. A chart for classroom use should be large enough to be read from any point in the room.
4. Make it attractive. Use contrast, color, and plenty of space.
5. Achieve contrast by using dark letters and figures on a light background or light letters on a dark background. Be sure that the important things stand out.
6. Use color when suitable. Even though color pleases the eye, don't overdo it. Keep the colors harmonious.
7. Remember that space is highly important. Leave plenty of space—at least equal to the filled-in space on the chart, and preferably more. Keep the margins generous.
8. When your plan is complete, sketch it lightly in pencil on the chart and complete it. An opaque projector is valuable in transferring your small sketch to a larger surface.

Materials

1. Gummed or cardboard letters and numbers are available in all sizes and types. Inexpensive sets provide several sizes of letters and figures in adequate quantities. Sources of such materials are listed on pages 535–536.
2. For bars, lines, etc., black or colored tape is both easy to use and inexpensive. Colored cellophane tape can be bought in a stationery store, and colored paper tape ⅞″ wide in art supply stores. The latter

can be secured for a nominal sum in red, green, blue, brown, black, and white in rolls of 10 yards. Rolls of black gummed tape in widths ranging from ⅛″ to 1″, and various gummed symbols such as arrows, circles, stars, and ovals can be purchased from local art supply stores.

3. Lettering pens, India ink, and drawing ink in various colors are good for outlines or straight lines. Speedball pens in several sizes can be purchased from a stationery store for a few cents per point. Better for extended lines are Payzant freehand lettering pens, available in stationery stores in various sizes. The #00 draws a 3⁄16″ line, the #0 a ⅛″ line, the #2 a 1⁄16″ line, etc.
4. Cornell board or other light-surfaced building boards are good for a base. Cornell board can be purchased in sheets 4′ x 8′ and cut to desired sizes. Large sheets should be braced or framed to avoid warping. Bristol board, a 10- or 14-ply cardboard, is suitable for smaller charts and does not require bracing. It may be obtained from stationery, art supply, or school supply houses in white or colors in sheets up to 30″ x 40″ at moderate cost. Various other materials can also be used. For example, a mattress carton obtained from a furniture store at little or no cost provides a good-sized piece of corrugated cardboard which can be painted over.

GRAPHS

Graphs may be defined as *visual representations of numerical data.* A table of figures may contain a wealth of valuable information, but a graph of the same data presents the gist of that information quickly and effectively. Furthermore, graphs reveal important relationships in the data—relationships such as trends and variations from normal. Finally, and of significance for the teacher, graphs are inherently more interesting than number tabulations, however well arranged the latter may be.

When Miss Gray wants to keep interest in library reading running high, one thing she may do is to post a progress graph showing the number of books read by each pupil in her class. Progress graphs can be purchased from school supply houses; these graphs have a number of bright red bars that are revealed by removing small sections of the overlaying paper. The pupils' names are inserted on the chart and one section of the overlay is removed for each completed project.

The appeal of graphs is not limited to youngsters. Who is not familiar with the large thermometers used to register progress in fund-raising campaigns for the Community Chest, the March of Dimes, or the new church to be built on the corner? The businessman relies on graphs to show the trends in his sales volume and he refers continually to them for information on business in general.

It is well to remember that the major purpose of graphing is to present comparative, quantitative information quickly and simply. When a graph is intricate and difficult to read, it loses its chief advantage. Graphic concepts that are complex are more effectively presented, as a rule, in a series of simpler graphs than in one intricate composite. If a composite graph is desirable for some reason, it should be preceded by a series of supporting graphs.

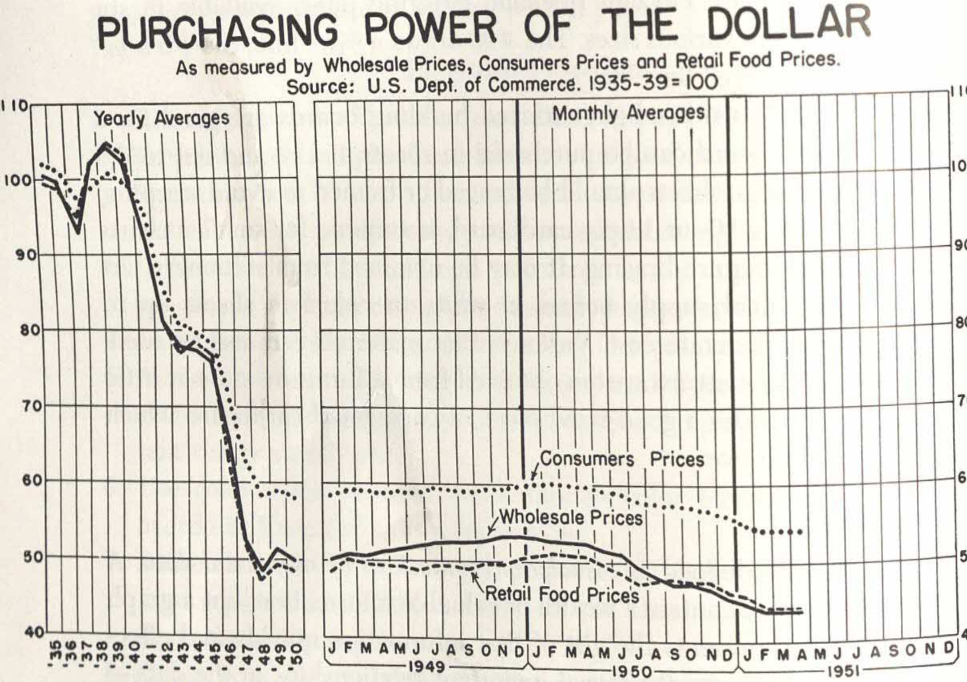


Fig. 5.6. Many types of data are effectively presented on line graphs which reveal trends and relationships at a glance. (Courtesy of National Research Bureau, Inc.)

TYPES AND ADVANTAGES OF GRAPHS

There are many kinds of graphs. Among those most commonly used are the line, bar, circle or "pie," and the pictorial graph. Each type has certain advantages.

Line Graphs

The line graph is the most accurate of all graphs. It is therefore particularly useful in plotting trends or relationships between two series of data. A line graph should be used when there are a considerable number of data to be plotted or when the data are continuous. The line graph shown in Fig. 5.6 was plotted from continuous data.

Variations of the line graph include the silhouette, the high-low, the band, and the shaded line graph. Pictorial illustrations and cartoons are occasionally used on line graphs to increase their interest and readability. A shaded line graph has greater attention-getting power than a solid line graph because it provides more contrast.

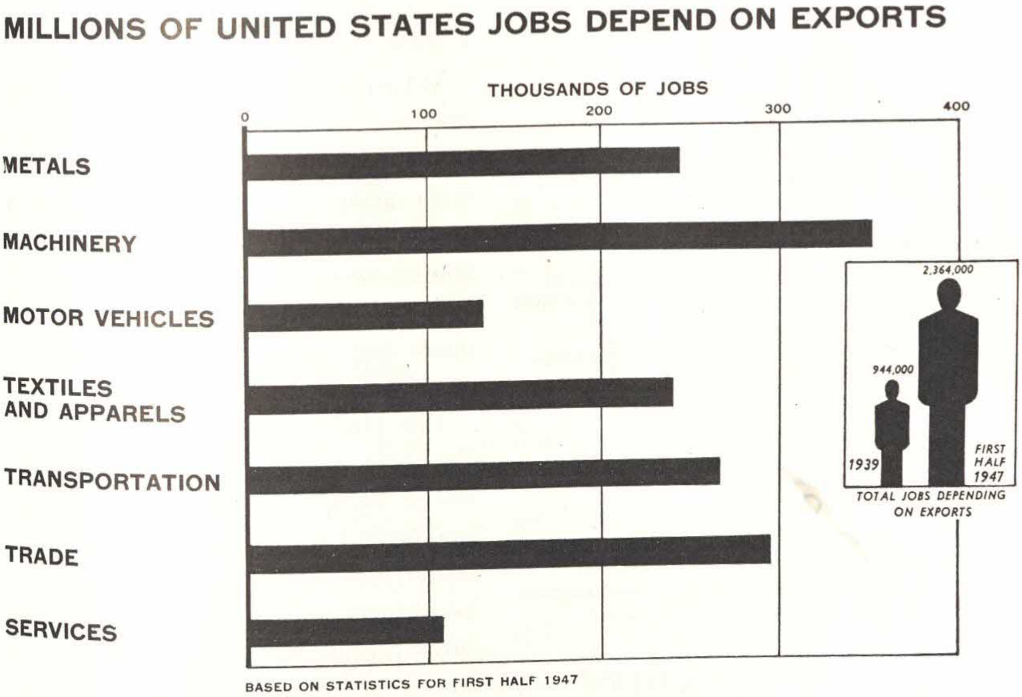
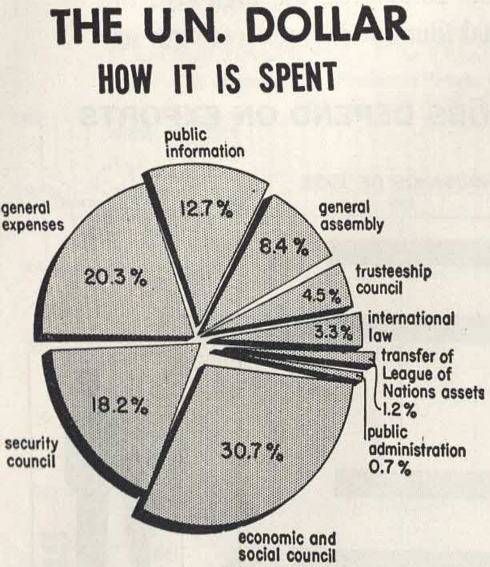


Fig. 5.7. Bar graphs like this are clear and distinct. (U.S. Department of State.)

Bar Graphs

Bar graphs are the simplest of all graphs to read and are likewise easy to construct. Each of the several groups of data to be plotted is represented by either vertical or horizontal bars. The length of the bars expresses the amount or percentage of the data; all the bars are of the same width. The bar graph is employed to best advantage when the number of values to be compared is small—usually no more than five or six. Occasionally a considerable number of bars are used, but in such instances additional elements such as color or pictorial representations are needed to make the graph more readable and interesting. The data in the bar graph in Fig. 5.7 are summarized vividly in the pictorial element at the right of the graph.



URCE: UNITED NATIONS

Fig. 5.8. Comparative data are strikingly presented on a pie graph; the pieces of the circle can be separated for added emphasis. (Courtesy of Pictograph Corporation.)

Circle or Pie Graphs

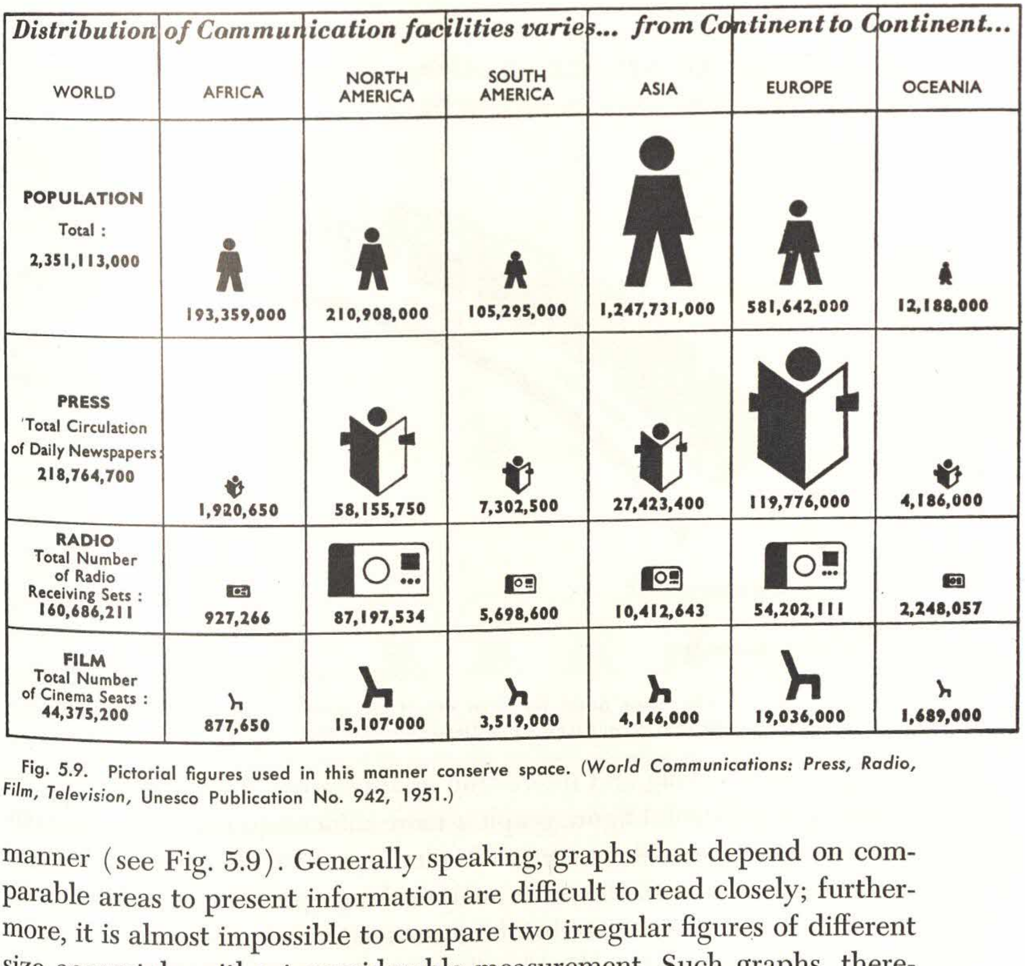
When the intermediate-grade mathematics teacher wishes to introduce the subject of fractions, he may start with an apple and cut it into halves and quarters. Later he may apply a similar technique with the feltboard or "slap" board, fitting segments of a circle together to form the complete circle.

The circle or pie graph is a circle the sectors of which are used to represent component parts of a whole. Such information as the sources of the school dollar, the distribution of expenditures of a municipality, or the proportional derivation of the world's petroleum supply is typically represented on pie graphs. A good example is shown in Fig. 5.8.

Two characteristics are common to all pie graphs. (1) They always present totals or whole amounts, and (2) their parts or segments are calculated in percentages or fractional parts of a whole. If a nation produces 10,000,000 tons of coal per year and 7,500,000 tons are bituminous, 2,000,000 anthracite, and 500,000 lignite, this information could be shown on a pie graph by shading 75 percent of the circle to represent bituminous production, 20 percent of it for anthracite, and the remaining 5 percent for lignite. When the point to be taught is the relationship of individual quantities to a whole, the pie graph is a natural and easily understood medium.

Area and Solid Figure Graphs

Other area graphs such as squares, circles, and irregular figures are occasionally used to compare two or three related totals. Frequently pictorial figures such as people, cattle, ships, or automobiles are used in this



Distribution of Communication facilities varies... from Continent to Continent...

WORLD	AFRICA	NORTH AMERICA	SOUTH AMERICA	ASIA	EUROPE	OCEANIA
POPULATION Total : 2,351,113,000	193,359,000	210,908,000	105,295,000	1,247,731,000	581,642,000	12,188,000
PRESS 'Total Circulation of Daily Newspapers : 218,764,700	1,920,650	58,155,750	7,302,500	27,423,400	119,776,000	4,186,000
RADIO Total Number of Radio Receiving Sets : 160,686,211	927,266	87,197,534	5,698,600	10,412,643	54,202,111	2,248,057
FILM Total Number of Cinema Seats : 44,375,200	877,650	15,107·000	3,519,000	4,146,000	19,036,000	1,689,000

Fig. 5.9. Pictorial figures used in this manner conserve space. (*World Communications: Press, Radio, Film, Television*, Unesco Publication No. 942, 1951.)

manner (see Fig. 5.9). Generally speaking, graphs that depend on comparable areas to present information are difficult to read closely; furthermore, it is almost impossible to compare two irregular figures of different size accurately without considerable measurement. Such graphs, therefore, sacrifice the definitive quality that is characteristic of effective graphing.

One value of this type of graph, however, is the fact that it is used infrequently enough to be somewhat unusual; hence it catches the eye quickly. Another advantage is the fact that the area graph takes less space than other types. Thus, two squares or two circles of different sizes, side by side, can represent two comparable amounts in a small space. The same information on a bar graph would require a considerably wider graph.

The solid figure graph (Fig. 5.10) is an area graph in which are used spheres, cubes, or other figures that give a three-dimensional effect. Although more striking and interesting in appearance than the flat type of area graphs, the solid figure graph is more difficult to read, because comparisons must be made in terms of volumes rather than in terms of area only. The reader must therefore analyze the graph in terms of cubic content rather than in terms of height or area—a rather difficult feat at best.

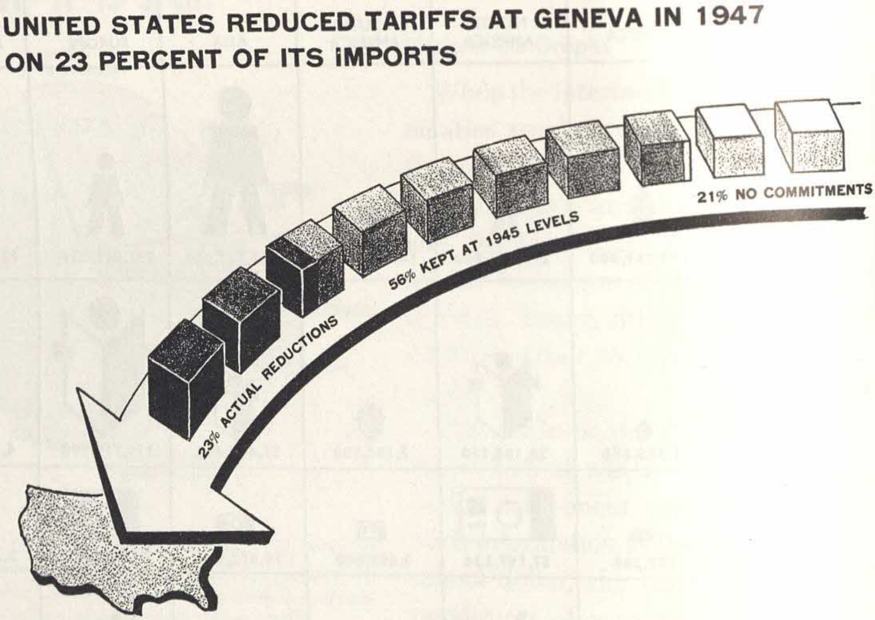


Fig. 5.10. In this solid figure graph the cubes are of the same size, the data being expressed in terms of degree of blackness or whiteness. (U.S. Department of State.)

Solid figure graphs are highly effective when pictorial figures are used instead of spheres or cubes. The novelty and realism of the pictorial solid make it the most attractive and attention-getting of any of the graphic forms. For this reason it is frequently used to give variety and interest to a long series of graphs or to focus attention on a highly significant comparison in such a series. The precise information is conveyed by the printed text on or beneath the graph itself.

Pictorial Statistics

Much of the eye-catching appeal of three-dimensional figures is attained by the flat, simplified, picture-like figures used in pictorial statistics. Pictures of this type give the graphic form realism and interest.

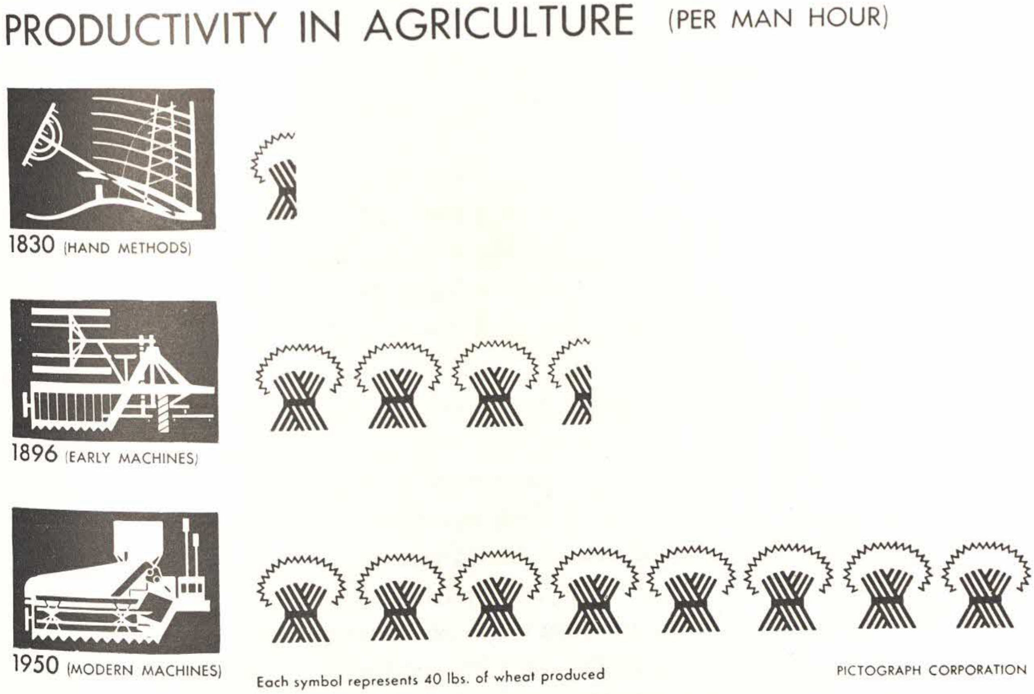


Fig. 5.11. In pictorial graphs symbols of the same size are used. (Courtesy of Pictograph Corporation.)

This type of graph, now used widely in magazines and newspapers, is as simple to read as a bar graph and it has the added advantage of using realistic figures to convey meaning. An example is shown in Fig. 5.11.

Pictorial statistics were first introduced in Vienna by Otto Neurath, the internationally known sociologist. Neurath constructed figures and symbols which he called "isotypes" and which are now used virtually everywhere in the western world. The immediate popularity of these "international pictographs" was due to the fact that they constituted a language equally intelligible to all nationalities. In addition these graphic symbols are easily understood by students at all grade levels and at most levels of intelligence.

PRINCIPLES OF PICTORIAL GRAPHING. Pictorial statistics may be used on any type of graph. Their use involves no special technique beyond that required for the basic graph form itself.

Good pictorial graphing follows the principles of effective nonpictorial graphing but has some unique principles of its own. The principle of simplicity, for example, applies to all graphs. Intricate graphs may be necessary on occasion in plotting a variety of related factors for industrial or economic purposes, but such graphs are not particularly helpful in the schoolroom. The most effective graphs highlight one or two ideas.

Another principle applicable to all graphs is that comparisons or relationships must be shown. Wheat production for a single year is not suitable for graphing unless it is compared with wheat production in other years or with the production of other grains in the same year. Graphing requires comparative data of some kind. Without comparisons or relationships to make them meaningful, there is no advantage in presenting statistics graphically.

A third principle of good graph construction is that approximations rather than precise amounts should be shown. A graph is intended to tell a story at a glance—to present comparisons and to show relationships. For these purposes minute details not only are unnecessary but tend to complicate the graph and to detract from its effectiveness.

The principles of simplicity, comparison, and approximation apply to all types of graphs. In addition there are two principles which apply particularly to pictorial graphs. (1) The pictorial symbols should be self-explanatory. (2) Quantities are usually indicated by the number of symbols rather than by their size.

Symbols such as the Neurath isotypes are striking because they can be identified at a glance. In fact, Neurath's whole aim in pictorializing social statistics was to provide significant information in a form that people everywhere could understand regardless of their language or location. A picture of a cow, a man, a woman, a child, a ship, or a sheaf of grain is understandable to virtually all peoples. Neurath found out how pictures of such universally familiar items could be trimmed to their essentials, and it was on this basis that he developed isotypes.

Amounts indicated by several symbols of the same size are more easily comprehended than amounts indicated by the areas of similar but different-sized symbols. The reason lies in the fact that accurate judgment of the area of an irregularly shaped object is difficult. Hence pictorial graphs normally use figures of one size, each figure representing a definite quantity; partial amounts are represented by partial figures. For example, each shock of grain in Fig. 5.11 represents 40 pounds. When the number of factors being compared is large, space may allow only a single symbol to be used for each item (see Fig. 5.9), the size of the symbol varying in proportion to the data it expresses. In this instance the advantage of concentration offsets the greater accuracy achieved if several standard-sized figures were used for comparative totals of newspapers, radios, and motion-picture theaters in the several continents.

USING GRAPHS IN TEACHING

The more abstract a teaching material is, the more experience a pupil must have in order to interpret it. Pictures convey meaning readily because they usually contain many elements already familiar to the student. Graphs, on the other hand, are principally symbolic and abstract in character; hence they are best used in the body and summary of a lesson after the student has acquired a background of information from other sources.

Children learn about graphs in intermediate-grade arithmetic—how to make them and how to read them. They see graphs in newspapers, magazines, and textbooks. Consequently graphic materials need not be regarded as completely foreign to a child's experience. The pictorial graph in particular is readily grasped by upper-grade or older pupils.

But the graph is by nature a summarizing device. It visualizes totals and the relationships between totals over a period of time. It expresses certain quantitative conclusions about a particular subject, such as immigration during a certain period, or comparisons of the armed forces of several nations.

The good teacher rarely begins a lesson with conclusions. To do so is to apply the principles of deductive rather than inductive reasoning. Most teachers find that learning is more efficient and productive when it proceeds from factual information to the application of facts and then to the principles or generalizations that arise from many such applications.

Somewhere between these extremes of the learning process are the necessary summaries which can best be presented by graphs. After studying about farming in Norway, Denmark, France, and Holland, the pupil is ready to interpret a series of graphs comparing milk, cheese, or butter production in the four nations. Before this he could probably read the graph, but it would have little meaning for him except as isolated factual information. With the experience gained through the study of books, pictures, films, and other media, he can bring a type of comprehension to the graph which would have been impossible at an earlier stage of learning.

SOURCES OF GRAPHS[8]

Graphs for most school subjects are to be found in textbooks, reference books, pamphlets, newspapers, and magazines. There are also special publications, such as *Graphic Trends*, which present business and financial information almost entirely by means of graphs. There are commercial companies which specialize in the preparation of pictorial materials. Government reports and annual reports of corporations and business houses likewise make liberal use of graphs. When appropriate to classroom topics, any of these sources may be used.

Another important source of good graphs is the school and the class itself. By working with graphs and in particular by *making* graphs, the students can learn very readily to read and to appreciate graphs as a unique and valuable means of imparting quantitative information.

POSTERS

Chéret, a French lithographer, was commissioned by Sarah Bernhardt, in 1860, to prepare some large-scale advertising illustrations for her forthcoming stage appearance in Paris. Strangely enough, it was there that the poster was born, for Miss Bernhardt's idea was a smashing success.

Somewhat later the French army adopted the poster idea for recruiting purposes. By World War I the American government was making extensive use of posters in recruiting for the armed services. Particularly effective were the posters prepared for the war loan drives during that war. Literally millions of these posters were distributed; they were prominently displayed on street corners all over the United States. The impact of these posters on the public was regarded by Treasury officials as a highly significant factor in the success of the loan drives.

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[8] For a list of sources of graphs, see pp. 545–547.

Thus the poster is not one of the older visual instruments. Its characteristics have developed from the particular needs it fills. The poster is a combination of bold design and color primarily intended to catch and hold the attention of the passer-by long enough to implant in his mind a significant fact, idea, or message.

CHARACTERISTICS OF POSTERS

The poster is a simple, dynamic medium. It must present its message in compact form that is capable of being comprehended at a glance. Since intricacy and complicated design might defeat this purpose, they are normally avoided.

Dramatic Simplicity

To attract attention, however, simplicity alone is not enough. The prominent features of the poster must stand out sharply. These features may be a photograph, a drawing, or a striking design. The recruiting poster of World War II (Fig. 5.12) showing Uncle Sam pointing his finger directly at the observer is unforgettable.

The eye-catcher in that poster is the head of Uncle Sam, shown against a solid blue background. His piercing eyes and pointing forefinger seem to follow and hold the observer from any angle. The drawing is vivid and striking enough to reach out and command attention. From it the eye travels quickly to the printed message below it.

Appropriateness

Not all posters carry such a high degree of the dramatic; they must rely on other means of attracting and holding attention. Advertisers make extensive use of posters to call attention to their products. They naturally strive for appropriateness in subject matter, because inappropriate treatment results in a psychological "letdown" that defeats the poster's purpose.

It would be unsuitable, for example, to use an extremely dramatic illustration in an advertisement of soap, nylon hosiery, or baby powder. For such posters advertisers often rely on universal eye-catchers like babies and attractive models. Appropriateness of the illustration to sub-

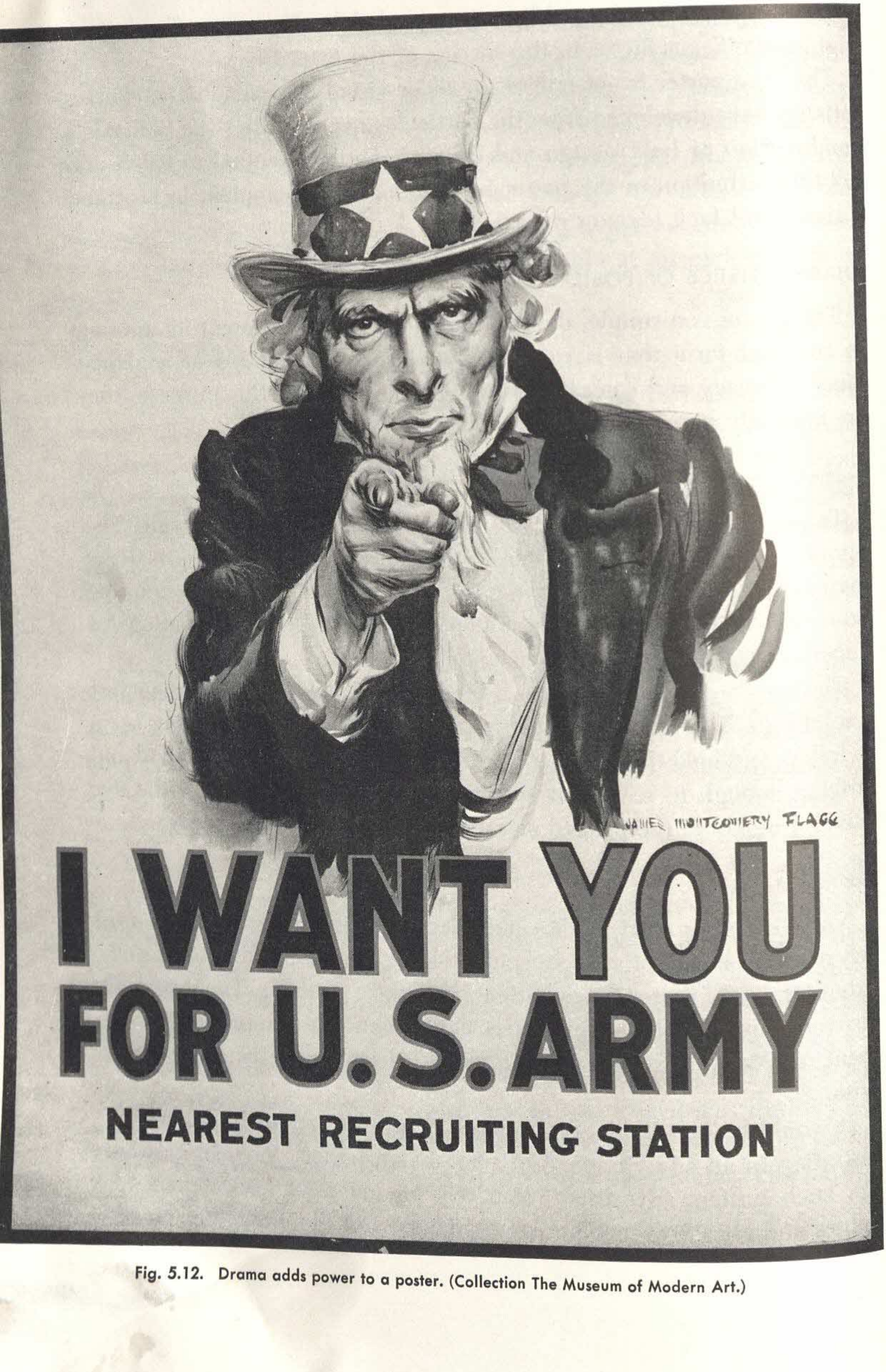

Fig. 5.12. Drama adds power to a poster. (Collection The Museum of Modern Art.)

ject and purpose is characteristic of good posters.

Limited Text

Most posters rely to some extent on words to convey the specific idea or message. Two things should be remembered, however, with respect to the use of words on posters. (1) Few words are generally used, and (2) key words are made to stand out by means of type size or position. The four words in the poster shown in Fig. 5.13 get the entire message to the reader more effectively than would a long sentence.

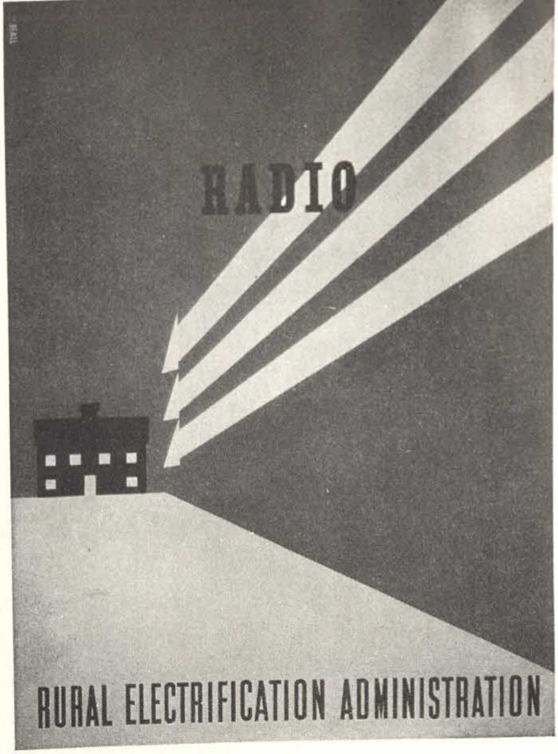

Fig. 5.13. Few words are better than many. (Collection The Museum of Modern Art.)

Attractiveness

Posters which are effective are usually pleasing to the eye. Although this is not necessarily true in the case of highly dramatic subjects such as war, traffic safety, fire hazards, and the like, posters in even these fields embody good design, good lettering, and attractive color. Other types of posters, such as those used for school courtesy and housekeeping campaigns, need to be attractive in order to hold attention once it has been caught. The attractive poster is inherently pleasing and interesting, both powerful factors in learning.

Design and Color

Composition, color, and technique are the principal elements in effective poster preparation. These elements are also applicable to flat pictures, charts, billboards, and bulletin boards—in fact, to any pictorial medium. But just as each medium has certain unique characteristics, so does it demand its own unique combination of composition, color, and technique.

As was said earlier, good composition in a photograph or painting requires a center of interest. The same statement holds true for a poster.

Yet the amount of detail and background in a poster is normally considerably less than in real life because the poster is designed to convey one sharply defined idea. For this reason subtlety is usually avoided in favor of unmistakable contrast and emphasis. A painting or photograph, on the other hand, frequently contains extensive detail and generally has to be studied to be fully appreciated.

Color provides meaning and expression as well as beauty in a good painting. It provides force and contrast as well as attractiveness in a good poster. These uses of color are not the same, although in both instances the artist makes effective use of it. The distinction again is based on the quite different purposes for which posters and paintings are created.

The technique of making posters is likewise very different from that involved in making a photograph or painting. Since the primary purpose of the poster is to catch and hold the attention long enough to get across a single idea or message, it must be clear, bold, and simple in design. Details are kept to a minimum, emphasis being given to the overall impression to be conveyed. Pictures, on the other hand, generally attempt to show their subject in faithful detail.

Posters usually contain prominent lettering as well as design and color. Effective paintings and photographs tell their story without the aid of words except in a supplementary capacity. A line beneath a picture may state the title and the purpose or locale, but the picture itself relates the story the artist wants to tell.

The poster thus has its own unique characteristics as far as technique, composition, and color are concerned. This is not to say that poster techniques exclude the characteristics found in other visual forms. Some posters use portraits, with all their detail, as the center of interest, as in the case of the recruiting poster in Fig. 5.12. Other posters may have a complete photographic background for their principal theme, or even a combination of such scenes (Fig. 5.14). In such instances the photographic background is normally subdued so that the message carried by the poster will stand out clearly in the foreground.

SUGGESTED USES OF POSTERS

From what has been said about the poster and its purposes, several uses suggest themselves to the classroom teacher.

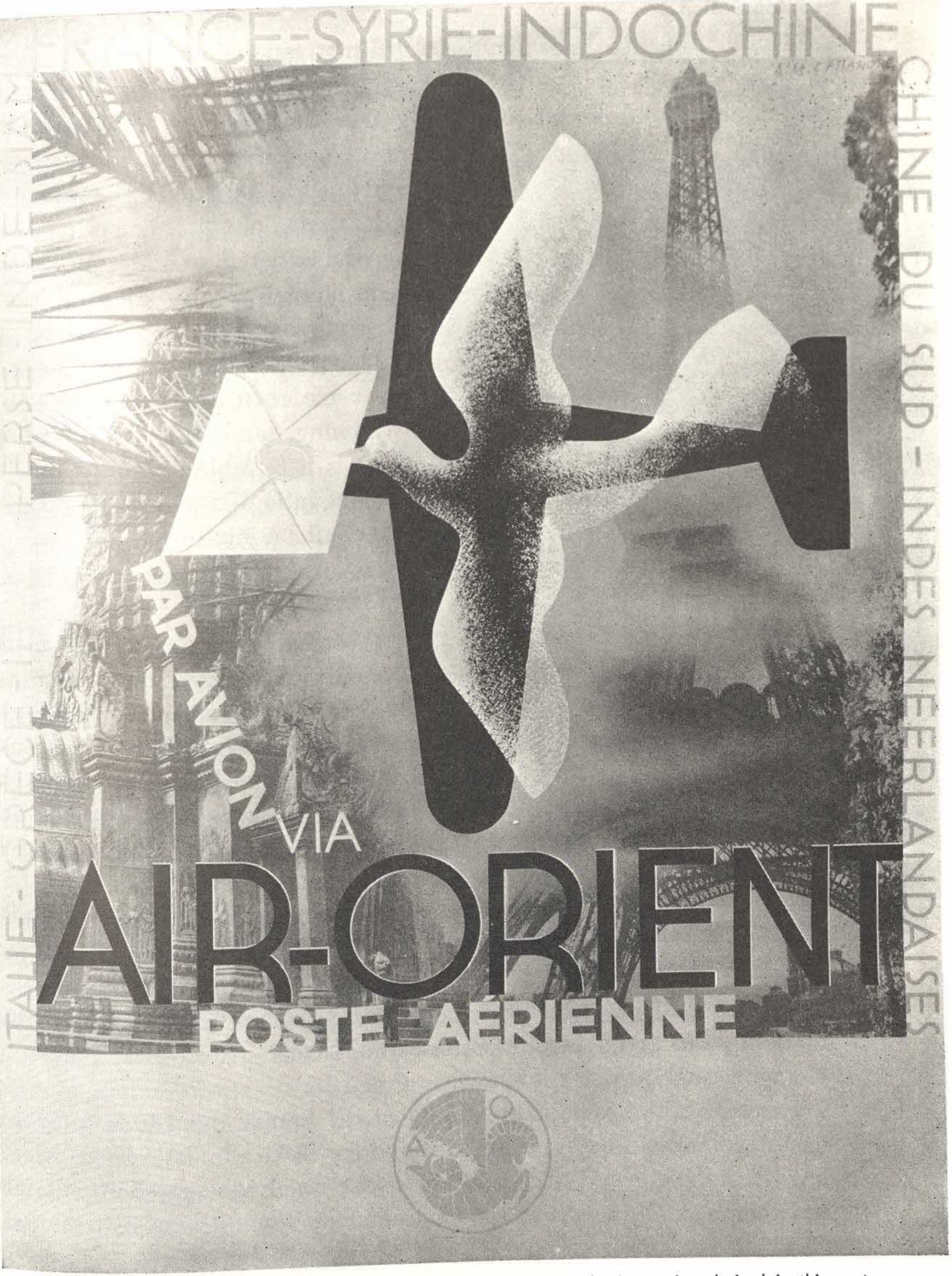

Fig. 5.14. The photographic background does much to create the impression desired in this poster. (Collection The Museum of Modern Art.)

For Motivation

The first of these uses may be called motivational or stimulative. A set of good travel posters on Great Britain could be used effectively in arousing curiosity and interest in a study of modern Britain. A poster on the resort area of Bath will suggest several leads to the teacher. For example, a discussion of what the poster shows may be initiated, or other resorts may be located on a map of England. There is also an opportunity of bringing out the fact that the people enjoy some of the same recreations as ourselves—swimming, sun bathing, and boating. Here is a possible starting point for understanding—a point of familiarity and common interest.

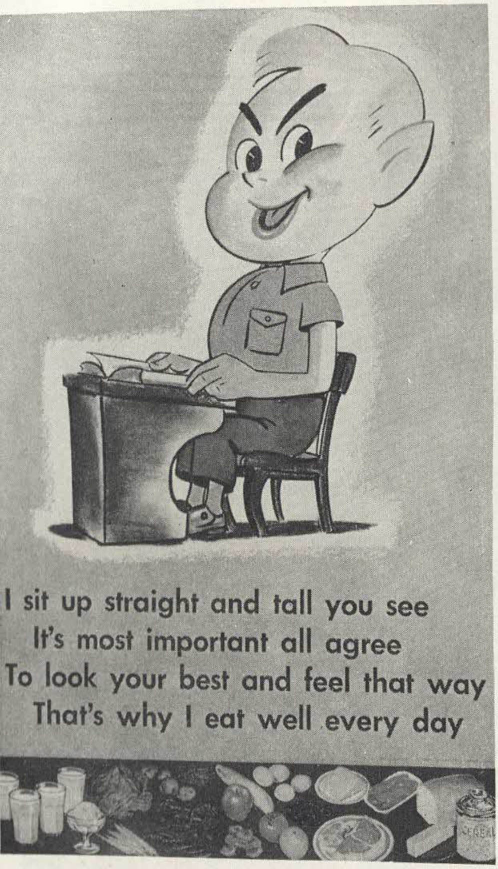
I sit up straight and tall you see
It's most important all agree
To look your best and feel that way
That's why I eat well every day
CEREAL

Fig. 5.15. Posters are useful reminders. (Courtesy of National Dairy Council.)

As Reminders

A second use of posters may be termed a reminder of awareness use. By the time he reaches the intermediate grades every child knows that brushing his teeth regularly is important. But, as teachers and parents are well aware, knowledge alone is seldom enough. There is need for frequent and varied methods of "jogging" the learner so that he will put his knowledge into regular practice until it becomes habitual. One means of doing this is by health posters strategically placed and frequently changed; such a poster is shown in Fig. 5.15.

Remember the remarkable ability of the human mind to become accustomed and indifferent to its surroundings. Like a bulletin board which has become yellowed with age, the poster which is seen too often tends to become simply a part of the environment. When it loses its freshness, the poster loses its principal value—the power to attract the eye and to impress the observer with an idea. Consequently it is ignored.

For Atmosphere

There is a third type of use, however, in which the poster may continue to serve a valuable purpose after its initial impact has passed. This may be called the atmosphere or environmental use. Teachers of foreign languages frequently find that good posters, as well as pictures, paintings, and exhibits, assist in creating a desirable atmosphere or feeling for the country whose language is being studied. Attractive poster materials enhance this atmosphere, particularly if they are artistically good.

For Creative Experience

A fourth helpful use of posters in teaching lies in their creative and participation possibilities. They present a situation in which the student can give play to what he has learned and make his own posters. In other words, it is a culminating and application type of activity that arises from a unit of work. A few students in a class in English literature, for example, might prepare posters for a Shakespearian play exhibit. In studying political campaigns history students can trace many interesting parallels in the political posters used at the turn of the century and those used today. Social studies committees and student councils analyzing current school problems such as playground safety, lunchroom conditions, recreational programs, and corridor traffic between classes find well-prepared posters an effective means of expressing their conclusions.

In Campaigns

The above use of pupil-prepared posters in connection with class activities is closely related to a fifth use which is perhaps most familiar of all. This is the campaign or advertising use of poster materials for school activities. Election campaigns for members of the student council, class plays, athletic contests, cleanup campaigns, music festivals, forensic contests, hobby shows, and the like are "naturals" for the preparation and use of posters.

Here is an excellent opportunity for the school to capitalize on the natural drive of pupil interests to accomplish socially important and desirable objectives. If these activities are treated as an important part of the school program rather than as peripheral and extracurricular activities, much valuable educational experience can result. In this experience the poster can be properly integrated as one of the important media for communicating ideas.

SOURCES OF POSTER MATERIALS

Commercial Sources

Numerous sources of commercially prepared poster materials are available to the teacher. In general these fall into two classifications: (1) advertising or sponsored poster materials, and (2) poster materials prepared and sold specifically for school use. Both sources provide posters of good quality which are well suited to classroom use.

The principal basis for selecting posters should be the extent to which they meet specific curricular needs better than any other materials available to the teacher. If the poster contains advertising, the teacher's good judgment will have to determine whether or not it has enough educative value to merit classroom use in spite of its commercial nature.

Clearly the public schools cannot allow themselves to become indiscriminate purveyors of commercial advertising materials simply because such materials may be free or inexpensive. The determining factor in all cases must be the educational welfare of the pupils for whom the schools exist. Conversely, a policy of using no sponsored materials is probably little more defensible educationally than a policy of accepting and using anything that can be secured at little or no cost.

Travel posters of good quality may be procured from railroads, steamship lines, and airlines. The information services of various nations disseminate interesting and instructive audio-visual materials of several types, including travel posters. Large industrial corporations likewise produce a wealth of materials calculated both to increase public understanding and to develop good will for the company. A considerable amount of industry-wide information in the form of posters, as well as pamphlets, charts, graphs, pictures, exhibits, slidefilms, and motion-picture films, is obtainable from associations of manufacturers, food processors, railroads, and the like. A list of these sources is given on page 547.

"Homemade" Posters

As suggested earlier in this section, pupil-made posters have much to commend them, from a standpoint of both experience and communication.

Psychologically the child is primarily interested in his immediate surroundings and the concerns arising from them. This is one of the bases for the educational principle that we must start instruction at where the child *is* and go on from there. This principle means, further, that effective instruction makes use of natural interests wherever practicable, and develops new experiences on the familiar foundations of the old.

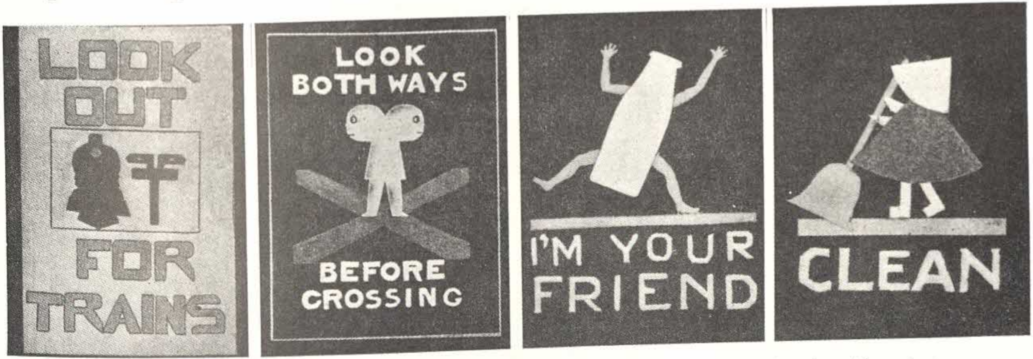

Fig. 5.16. Pupil-made posters can have a definite purpose. Such posters can visualize key ideas in many subject areas. (Copyright by The Davis Press, Publishers, *The Art Teacher.*)

The social studies teacher, in applying this principle of learning, encourages active interest in school political campaigns as one means of developing an understanding of politics in a democratic society. One of the activities implicit in such campaigns is the use of slogans, banners, mottoes, and, of course, posters. Such posters, however, cannot be bought; therefore they must be made by the pupils. "Pupil-made posters," in the words of one social studies specialist, "represent the fruition of social concepts and measure the effectiveness of teaching. Their construction and presentation is more apt to result in personal and social growth of students than is the display of posters secured from travel or advertising agencies."[9]

The pupil-made poster likewise is well suited to publicity for such school activities as plays and athletic contests. It may well reach its maximum effectiveness in cleanup, safety, courtesy, and similar campaigns, particularly when the campaigns are pupil-initiated. Such posters, like those shown in Fig. 5.16, serve as reminders and stimulaters of socially desirable action or as deterrents to undesirable behavior.

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[9] Harris Harvill, "The Use of Posters, Charts, Cartoons, and Graphs," *Eighteenth Yearbook of the National Council for the Social Studies,* 1947, p. 120.

Actually construction of a good poster is not difficult; Fig. 5.17 indicates one way of making effective posters. The teacher should know what qualities constitute a good poster and how to make one so that he can help his pupils. The art teacher is often glad to assist, for poster work provides an excellent opportunity for the desirable integration of art and other subject-matter fields.

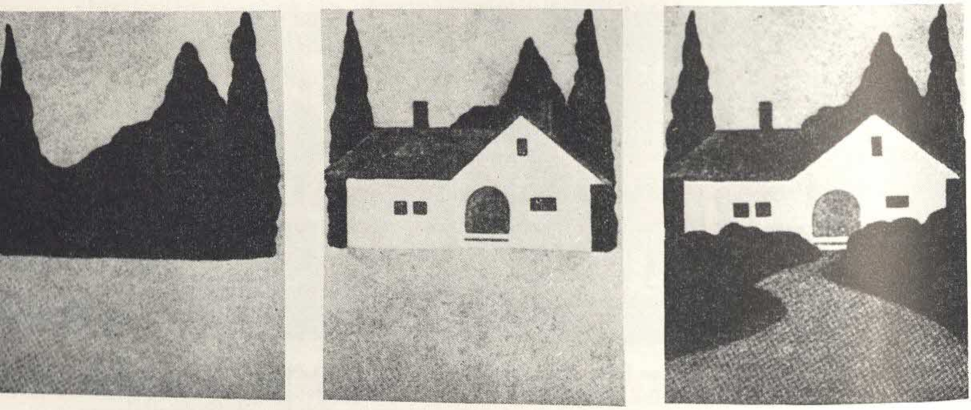

Fig. 5.17. Cutouts can be used effectively in making posters. Here three steps in the process are illustrated. (Copyright by The Davis Press, Publishers, *The Art Teacher*.)

As was said above, the basic principles of good posters are simplicity, appropriateness, attractiveness, and design and color, the latter including such factors as contrast, center of interest, originality, proper size, and good use of color. Many considerations enter into the practical application of these principles, but the teacher who keeps them in mind will find that good posters are easy to make.[10]

CARTOONS

Still another unique medium for communicating ideas is the cartoon. The serious cartoon is *a pictorial representation or caricature of a person, idea, or situation that is designed to influence public opinion.* Although an increasing number of excellent cartoons are intended merely to make people chuckle—this is true of most of those in *The Saturday Evening Post* and *Collier's*—it is the cartoon as an instrument of propaganda that has the chief potentialities in teaching. It is the latter type with which the following discussion is concerned.

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[10] For an exceptionally useful manual on poster construction, see H. A. Schoenoff, K. R. Schoenoff, and H. Cavanaugh, *Poster Making in the Elementary School,* Row, Peterson, Evanston, 1948.

ESSENTIAL CHARACTERISTICS OF CARTOONS

A good cartoon is built around a single idea. Typically it may employ caricature, satire, exaggeration, symbolism, and humor of a sort. The humor may and frequently does extend to outright ridicule, particularly in cartoons on controversial political subjects in highly partisan newspapers. In some cases the extensive use of cartoons on political and social subjects has given this medium an abusive characteristic typified by personal attacks on high-placed officials.

The power of the cartoon to influence public opinion lies in its compactness, its simplification of issues, and the considerable interest that can be aroused by sharply drawn illustrations laced with humor. It is a predigested source of information with a strong visual impact. Many persons who may not read a newspaper's editorials follow its cartoons regularly. Thus it is that the militant cartoonist on large metropolitan newspapers is regarded as a potent factor in forming public opinion.

HOW CARTOONS BEGAN

The modern political-social cartoon originated during the nineteenth century.[11] Andrew Jackson and his spoils system were among the first subjects of political caricature. Later, in the 1860's, Thomas Nast conducted his famous cartoon campaign against the notorious Tweed Ring in New York. It was Nast who created the now standard symbols—the Tammany tiger, the Democratic donkey, and the Republican elephant. Nast and Joseph Keppler, the latter the originator of the famous cartoon character "Puck" during the same period, set a pattern of attack against individuals as a means of getting at important issues. This pattern still characterizes most American cartoons on political and social subjects.

The use of the cartoon psychology of lampooning man and his foibles goes back to ancient times. Archaeologists have uncovered on the walls of ancient buildings many drawings which poke fun at the great and the pretentious. Medieval manuscripts contain similar evidences of refreshing humor directed at persons and groups prominent in contemporary society. One writer has drawn an interesting analogy between the functions of the king's jester in medieval times and those of the modern cartoonist.[12]

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[11] Albert J. Nock, "The King's Jester: Modern Style," *Harper's Magazine*, March, 1928, p. 482.

SELECTION AND EVALUATION OF CARTOONS

The answer to the question "What is a good cartoon?" is as elusive as an acceptable definition of good art. For practical purposes the answer may well be that the cartoons that are effective with their intended audience are good cartoons. This has certain implications for the teacher who is selecting cartoons for teaching purposes.

Appropriateness to Experience Level

The first implication is that the meaning of the cartoon must be understandable by the class in which it is to be used. A cartoon on the Marshall Plan or the M.S.A., for example, will mean little to a sixth-grade pupil who knows nothing about the European recovery activities in which the United States is engaged. The same pupil on the other hand may readily interpret an equally subtle cartoon on traffic safety or sportsmanship.

Schaffer's study of children's interpretations of social and political cartoons found that on the average children begin to interpret such cartoons abstractly at about age 13. The range of greatest increase in percentage of abstract response to symbolic drawings occurs between Grades 6 and 8.[13] An analysis of erroneous interpretations, furthermore, showed that the absence of meaning of word elements in cartoon captions—in other words, lack of a background adequate to give correct meaning to the words used—was a particular cause of error.[14]

Simplicity

A second implication of the effectiveness criterion of cartoons is that they should have certain desirable mechanical characteristics. One of these is simplicity. Generally speaking, the better cartoons contain only essentials; they depend more on key characteristics for recognition than on extensive photographic detail. Roosevelt's chin and cigarette holder, Hitler's mustache and forelock, and John L. Lewis' bushy eyebrows are familiar examples. A few sharp lines, some shading, and the necessary background sketched in lightly are the principal mechanical ingredients of a good cartoon. The creative artistry and imagination of the cartoonist are evidenced by the overall effect he can attain with these physical elements and an idea.

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[12] *Ibid.*, pp. 481–488.

[13] Laurence W. Schaffer, *Children's Interpretation of Cartoons*, Bureau of Publications, Teacher's College, Columbia University, New York, 1930, pp. 51–52.

[14] *Ibid.*, p. 66.

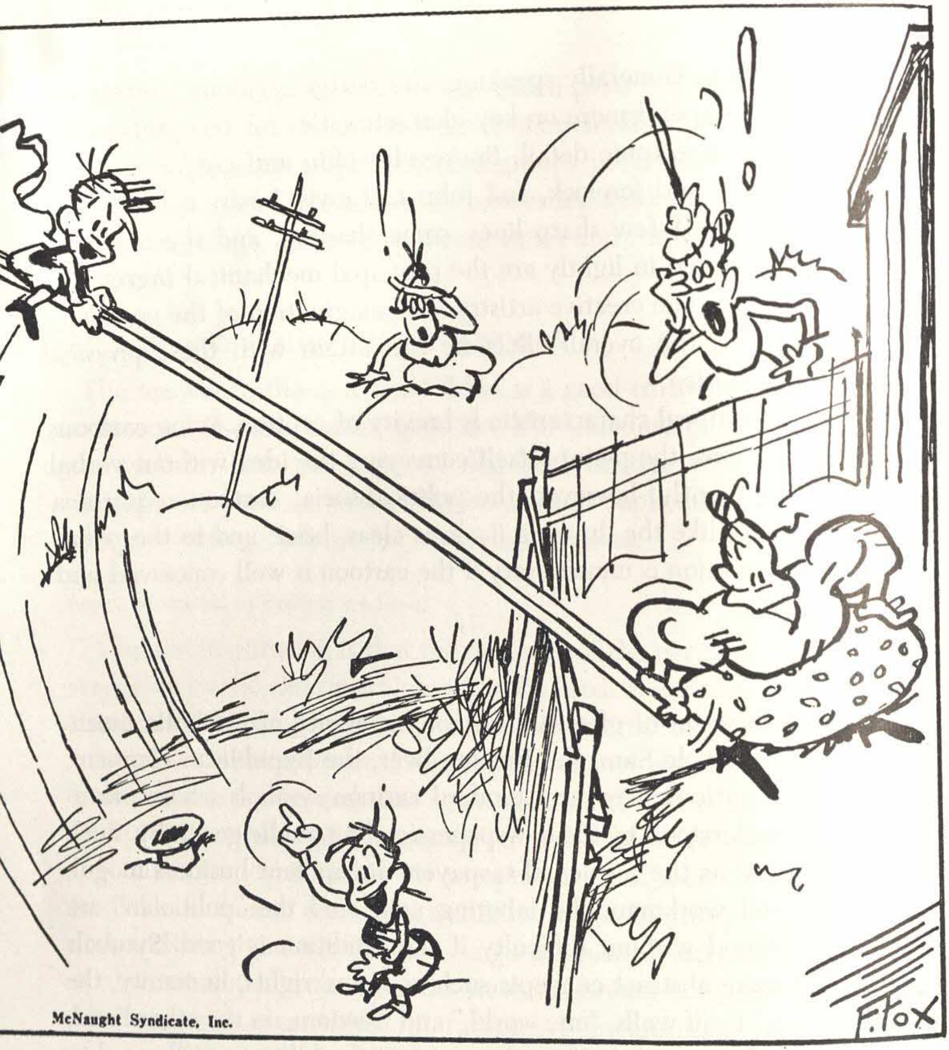
Another mechanical characteristic is brevity of caption. Some cartoons require no captions, the picture itself conveying the idea without verbal assistance. Frequently, however, the political-social cartoon requires a caption, but this, like the drawing itself, is clear, brief, and to the point. Extensive explanation is unnecessary if the cartoon is well conceived and well executed.

Clear Symbols

A third implication of effective cartoons is clarity of symbolic meanings. John Bull, Uncle Sam, the Russian bear, the Republican elephant, and the Democratic donkey are standard cartoon symbols whose meanings are well understood by the newspaper-reading public generally. Such characterizations as the burdened taxpayer, the opulent business mogul, the unemployed workman, the laboring man, and the "politician" are usually understood without difficulty if the rendition is good. Symbols representing more abstract concepts such as states' rights, humanity, the "common man," tariff walls, "one world," and freedom, on the other hand, are more difficult to express. Here the cartoonist's ability is challenged to the utmost. Accordingly, teachers must be careful to select cartoons whose symbols are not too abstruse for their pupils.

Adequate Size

The final implication of effective cartoons is size. When newspaper cartoons are reduced for reproduction in news magazines or textbooks, the captions are often difficult to read and significant details are hard to see and interpret. Using an opaque projector minimizes but frequently does not eliminate these difficulties because the copy itself is overly compressed. When possible, it is better to mount the original newspaper



McNaught Syndicate, Inc.

Fig. 5.18. Cartoons may combine humor with illustrations of scientific principles. (From Robert S. Shaw, "Physics in Humor," *The Science Counselor*, March, 1951. Used by permission of Fontaine Fox.)

cartoon on cardboard and use an opaque projector for showing it to the class.

SUGGESTED USES OF CARTOONS

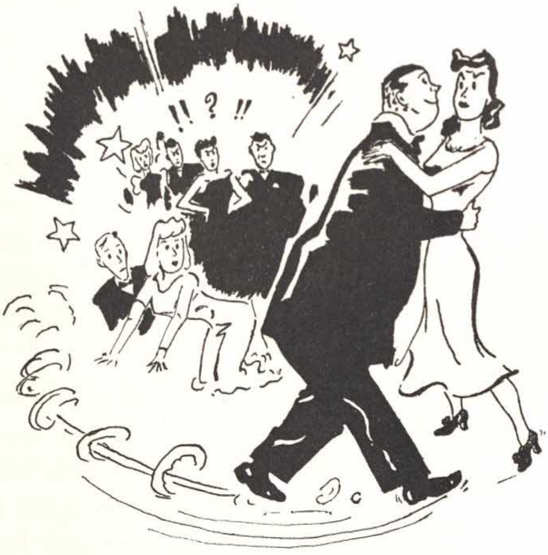
For Motivation

By nature an effective cartoon readily attracts attention and arouses interest. This suggests at once that appropriate cartoon materials can be useful motivation devices in the classroom. Cartoons on current topics, if suited to lesson objectives, are effective discussion starters. Such questions as "What does this cartoon mean?" "Does it tell the whole story?" and "What other cartoons have you seen on this subject?" can start the ball rolling quickly in a junior- or senior-high-school social studies class.

As Illustrations

One teacher reports effective results from using cartoons to illustrate scientific concepts in teaching science.[15] Some he uses to raise such questions as whether or not the situations pictured are scientifically possible or probable. Others illustrate drawing errors such as giving insects only two legs. Still others show the result of disregarding safe practices or the scientific method; this is done by asking the students what is wrong in the situation illustrated. This teacher emphasizes the necessity of selecting cartoons carefully so as to avoid purely humorous reactions among pupils on the one hand, and, on the other, pointless attention to details unrelated to the cartoonist's purpose.

A general science instructor might find the cartoon shown in Fig. 5.18 a vivid way to explain the principle of the lever in relation to the placing of the fulcrum.[16] Cartoons provide teachers with two valuable assets—good illustrations of significant learning points, and change of pace and variety in presentation.



Be a Floor Hog!

Fig. 5.19. Social guidance is a natural field for the high-school cartoonist. (Courtesy of Bernadine Kunkel, Elgin Public Schools.)

For Pupil Activity

Another type of cartoon usage involves the creation of cartoons by the students themselves. Pupils make cartoons to enliven interest in cleanup and safety drives. The student council finds cartoons particularly well suited as reminders of courtesy, sportsmanship, and lunchroom behavior campaigns. Such devices, created by the pupils and containing the type of humor suited to their stage of maturity, are psychologically sound. They are likely to be effective even though inexpert in execution.

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[15] *Ibid.*

[16] John D. Wollever, "Using Cartoons in the Classroom," *School Science and Mathematics*, April, 1950, pp. 255–258.

Classroom production of pupil cartoons is likewise a useful activity. The social studies are a constant source of ideas suitable for cartoons. Literature and grammar also provide opportunities for drawing cartoons as illustrations of the knowledge acquired.[17] Fig. 5.19 shows a pupil-made cartoon that is directed at courtesy.

SOURCES OF CARTOONS

So far as the authors are aware, there is no source where commercial cartoons created specifically for school use can be purchased. Numerous educational publications such as the *Scholastic Magazine, Weekly Reader, American Observer,* and *Current Events* incorporate appropriate cartoons from time to time. Textbooks, particularly in the social studies, reproduce outstanding cartoons to illustrate social and political concepts and events.

The metropolitan daily press and weekly magazines of national circulation are the most prolific sources of cartoon materials because these publications have the mass audience for which the best cartoons are created. Over a period of time the alert teacher can build up a valuable file of cartoons for both current and future use. Mounting them on cards and filing them in folders labeled according to curriculum topics makes it easy to locate these cartoons.

A second source of valuable cartoon materials is the students. While most pupil-made cartoons have only transitory value, some will be worth keeping for later use with other classes. The developmental value derived by the pupil from making cartoons a part of his learning activity is the primary consideration in such cases, regardless of the quality of the resulting creation.

COMICS

Closely related to the cartoon is the comic strip.

The comics are very much with us. Estimates have placed the readers of comics in the United States at well over 100,000,000.[18] Between 300 and 400 comic book titles are on sale and some 60,000,000 copies are sold each month. Translated into more than thirty languages, they are widely read in more than 100 countries.[19] The immense popularity which comics have attained can perhaps be attributed in large measure to the need felt by millions of people of all ages for humor, gaiety, and entertainment. Whether or not educators and parents are inclined to approve of comics, all will agree that this medium of communication has become firmly established in our society.

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[17] Edith E. Mains, "The Cartoon and the Teaching of Grammar," *English Journal,* April, 1945, pp. 506–507.

DEFINITION AND CHARACTERISTICS OF COMICS

Comics may be defined as *a form of cartooning in which the same cast of characters enacts a story in a sequence of closely related drawings designed to entertain the reader.* Whereas the cartoon depends primarily upon visual impact, comics usually incorporate speech in the drawings to help carry the story. Another distinction is the fact that comics are intended essentially to amuse or thrill. Although many cartoons are extremely humorous, the most unique and forceful contribution of the cartoon is made in politics and social problems rather than in entertainment.

Several other characteristics of comics should be recognized if the force of this medium is to be appreciated. Comics focus on people. The stories are personalized so that the reader can readily identify himself with the feelings and actions of the leading characters. The stories are brief enough to hold attention, they are packed with action, and in the Sunday supplement and the comic book they are made more vivid and appealing through the liberal use of primary colors.

HOW COMICS STARTED

Newspaper Rivalry

It is interesting to note that comics received their initial impetus from a newspaper war between William Randolph Hearst and Joseph Pulitzer in the mid-1890's. Colored supplements to the Sunday issues of the New

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[18] W. M. Marston, "Why 100,000,000 Americans Read Comics," *American Scholar*, 1943-1944, p. 1.

[19] "Comic Strips Must Be Taken Seriously," *Unesco Courier*, March, 1950, p. 9.

York *Journal* and the New York *World* vied mightily with each other to build circulation.[20]

A significant part in this rivalry was played by funny drawings and by a character who came to be known as "The Yellow Kid." Drawn by Richard Outcault, this sketch achieved rapid popularity and accordingly increased the circulation of Pulitzer's New York *World*. Within six months Hearst came out with a new comic section, ". . . eight pages of iridescent polychromous effulgences that make the rainbow look like a piece of lead pipe." Headlining his cast of characters was "The Yellow Kid," for Hearst had hired Outcault and his creation away from the *World*. Pulitzer promptly bought him back, but was again outbid by Hearst. Thereupon Pulitzer hired another artist and for a time both papers attempted to outdo each other with independent versions of the vulgar, raucous "Kid."[21]

The significant point of this story is that the initial purpose of comics was to build newspaper circulation. In the process, however, they became firmly embedded in the consciousness of the American public. It is worth noting that their purpose is still primarily commercial—to sell newspapers and comic books.

Comic Strips

New comics were quickly created. "Buster Brown" by Outcault and "The Katzenjammer Kids," the longest-lived of all comics, appeared by the close of 1902. With the Katzenjammers Rudolph Dirks introduced the play-by-play story told in a series of separate pictures with the same characters. James Swinnerton carried forward the idea of using the same characters, added frame lines to the boxes, and developed an appealing comic-strip personality in "Little Jimmy." By 1905 the comics had acquired practically all the physical features which characterize them today—all, that is, except the format used in the relatively recent comic book.

Comic Books

The comic book came into prominence in the mid-1930's. The lag between universal acceptance of the comic strip and the appearance of comic books on a large scale is curious, for early versions of the comic book had been used successfully as premiums in promotional campaigns as early as 1911.[22] Once the idea caught on, however, comic books developed rapidly into big business. In 1947 they were selling at the rate of 40,000,000 per month, and by 1949 this figure was estimated to be over 60,000,000 copies.[23] At ten cents per copy this represents an annual expenditure of $72,000,000 for comic books alone.

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[20] Coulton Waugh, *The Comics*, Macmillan, New York, 1947, pp. 6 ff.

[21] *Ibid.*

Numerous circulation studies have indicated that comic books are read almost universally by children in the intermediate grades, by nearly half of all high-school pupils, and by approximately one-third of our population between the ages of 18 and 30.[24] By their junior or senior year in high school more than half the pupils stop reading comic books entirely or read them only occasionally.[25] These studies merely substantiate what parents and teachers already know—that comics have become a major influence in the lives of American boys and girls.

USE OF COMICS IN INSTRUCTION

The extensive popularity of comics has led many teachers to experiment with this medium in teaching. Much of this experimentation has been done in the language arts at the intermediate and junior-high-school level, although similar experiments in science, history, the social studies, and even religious education are not uncommon. Fig. 5.20 shows comic techniques applied to information in the field of history.

Values Derived

Language and literature instruction apparently benefited in four ways from the use of comics, according to the studies made. These are: (1) increased interest in the subject, (2) the individualizing and personalizing of instruction for certain types of pupils, (3) valuable practice in reading, and (4) a widening of reading interests.[26]

Using a specially prepared comic workbook in such activities as vo-

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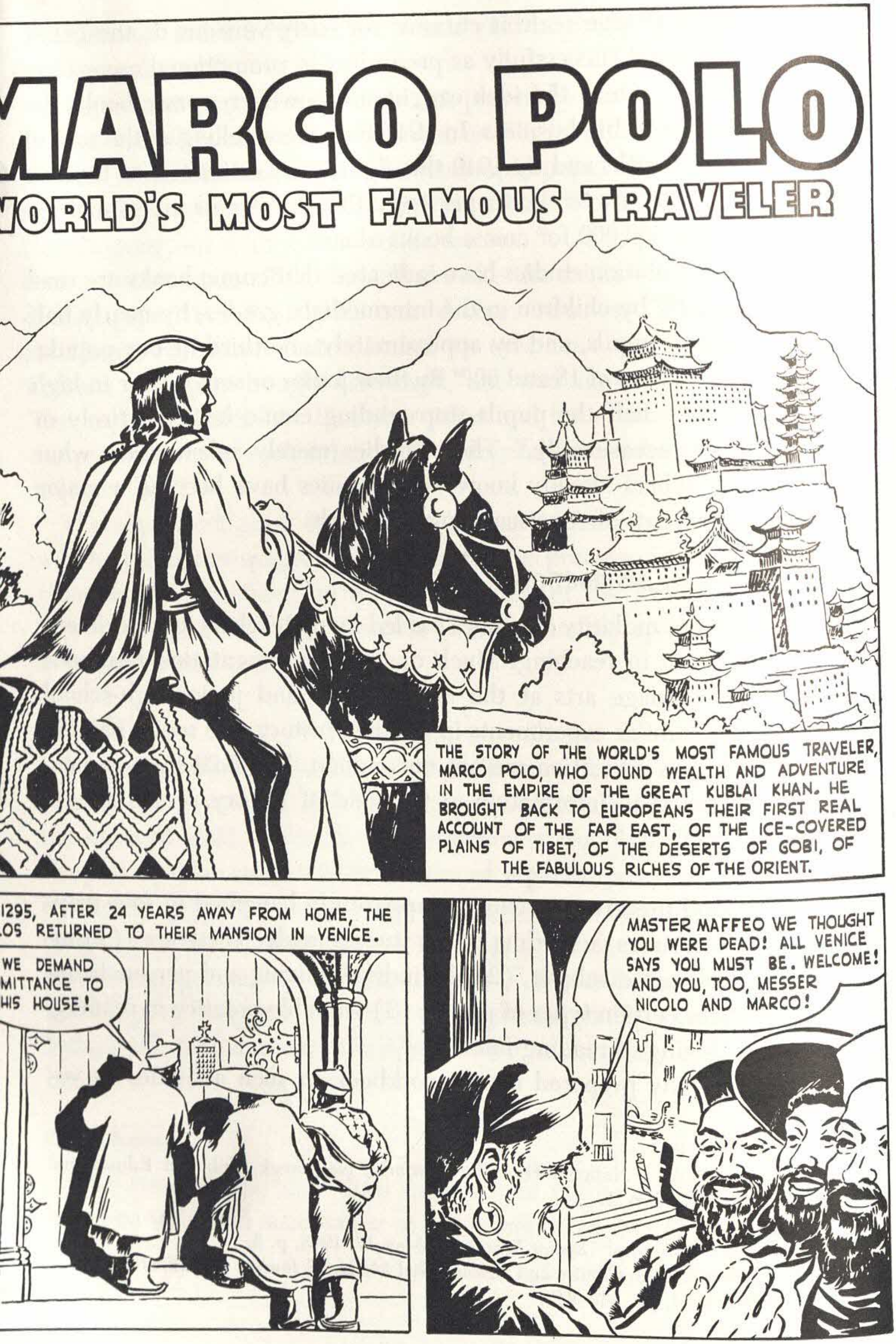
[22] *Ibid.*, pp. 335–340.

[23] "Are Comic Books a National Hazard?" *Platform*, Newsweek Club and Educational Bureaus, February, 1949, p. 1.

[24] *Ibid.*, p. 2.

[25] "Who Reads the Comics?" *Senior Scholastic*, May 17, 1948, p. 3.

[26] W. W. D. Sones, "The Comics and Instructional Method," *Journal of Educational Sociology*, December, 1944, pp. 232–240.


MARCO POLO
WORLD'S MOST FAMOUS TRAVELER
THE STORY OF THE WORLD'S MOST FAMOUS TRAVELER, MARCO POLO, WHO FOUND WEALTH AND ADVENTURE IN THE EMPIRE OF THE GREAT KUBLAI KHAN. HE BROUGHT BACK TO EUROPEANS THEIR FIRST REAL ACCOUNT OF THE FAR EAST, OF THE ICE-COVERED PLAINS OF TIBET, OF THE DESERTS OF GOBI, OF THE FABULOUS RICHES OF THE ORIENT.
1295, AFTER 24 YEARS AWAY FROM HOME, THE LOS RETURNED TO THEIR MANSION IN VENICE.
WE DEMAND MITTANCE TO HIS HOUSE!
MASTER MAFFEO WE THOUGHT YOU WERE DEAD! ALL VENICE SAYS YOU MUST BE. WELCOME! AND YOU, TOO, MESSER NICOLO AND MARCO!

cabulary interpretation and identification of language forms, Downes found unusual interest among his pupils. In fact, he was faced with a unique problem when, as the result of his use of this workbook, the class completed a week's work in one day.[27] International Harvester's house organ achieved only 12 to 15 percent readership of articles on economics, but secured 84 percent readership with a comic on the Taft-Hartley Act.[28]

Sones[29] points out that slow readers and nonacademic and unsocial pupils may particularly benefit from comic-book instruction. With each group the picture story materials proved valuable both in arousing interest and in providing remedial activity suited to the learner's individual needs.

Several teachers of English have reported worth-while results from using comics as a basis for broadening reading interests in literature. Lee[30] and Kinneman[31] built units of work around comics brought in by their pupils. These units involved an analysis of cartoon techniques, and the students developed standards of quality through group discussion. Both Kinneman and Sullivan[32] drew up reading lists from a great variety of literary sources which provided the same or similar satisfactions as the comics did.

Studies of the Use of Comics

An analysis of the language of the comics by Thorndike[33] indicated several points of interest. Perhaps the most significant of these is the finding that a child who reads one comic book per month will read approximately twice as many words per year as his reading book contains.

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[27] Harry Downes and Robert L. Thorndike, *The Superman Workbook*, Juvenile Group Foundation, New York, 1949.

[28] "Are Comic Books a National Hazard?" p. 13.

[29] W. W. D. Sones, "Comics in the Classroom," *School Executive*, October, 1943, pp. 31–33.

[30] Harriet Lee, "Discrimination in Reading," *English Journal*, November, 1942, pp. 677–678.

[31] F. C. Kinneman, "Comics and Their Appeal to the Youth of Today," *English Journal*, June, 1943, pp. 331–335.

[32] Beryl Sullivan, "Superman Licked," *Clearing House*, March, 1943, pp. 428–429.

[33] Robert L. Thorndike, "Words and the Comics," *Journal of Experimental Education*, December, 1941, pp. 110–113.

Fig. 5.20. Worth-while "comics" can vitalize the distant past. (Courtesy of Parents' Institute.)

Thorndike concluded that both the amount and the character of the vocabulary provided valuable practice in reading for the young reader.

The unique contribution of the comics as compared to that of printed text was investigated by Sones.[34] In an exploratory study with 400 sixth- and ninth-graders he used the comic magazine *Wonder Woman* as one approach to the life and work of Clara Barton. A printed text was used for his control groups. He found that mean scores among the picture groups ran from 10 to 30 percent higher on the first test. When the control groups were given the picture story, their scores on the second test improved significantly more than did the scores of the picture groups who were given the printed text. In summary Sones says, "In other words the picture groups seemed to have learned almost as much as they were capable of learning from their first reading while the groups reading the printed texts first had not reached the saturation point, but did so by a second reading in the picture form."

Experimental evidence on the educative value of comics and the best methods of using them is as yet quite limited. The same statement, however, can be made with respect to such well-established media of instruction as the flat picture, models, maps, and charts.

The teacher who uses comics in any of the curricular areas for which they are available will be aware of the need for applying sound principles of utilization. He will, for example, exploit the motivating potential of comic books in getting units off to a good start, but he will not stop there. Once interest has been aroused, the picture story can be supplemented by other reading materials, films, flat pictures, models, experiments, and a variety of creative activities. The principal merit of the comic book in instruction may be its capacity to create interest—interest, as teachers well know, that is essential to effective learning. If properly selected and incorporated in teaching methods, the comic can be an effective teaching tool.

SOURCES OF COMICS

Sources of suitable comic teaching materials are varied. The State Department sent 4,000,000 comic books to Korea in 1950 to inform the

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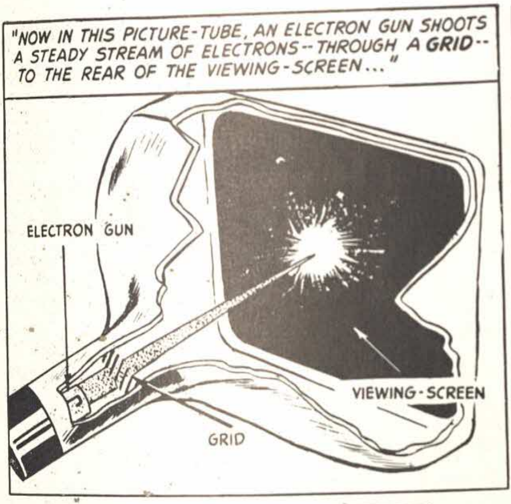
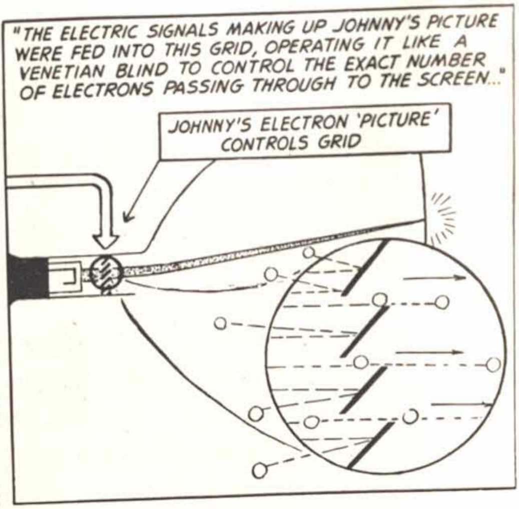
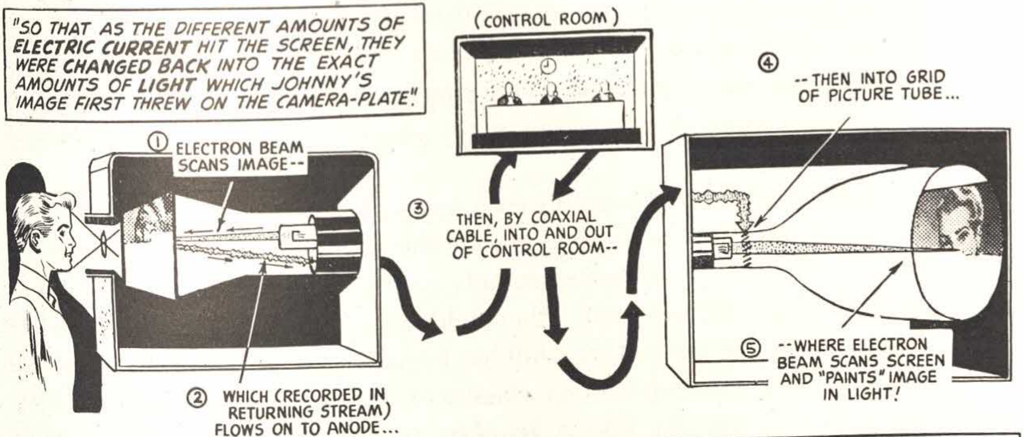
[34] W. W. D. Sones, "The Comics and Instructional Method," pp. 238–239.

Fig. 5.21. Comics make television more understandable. (Courtesy of General Electric Company, copyright Pictorial Media, Inc.)


"NOW IN THIS PICTURE-TUBE, AN ELECTRON GUN SHOOTS A STEADY STREAM OF ELECTRONS--THROUGH A GRID--TO THE REAR OF THE VIEWING-SCREEN..."
ELECTRON GUN
VIEWING-SCREEN
GRID


"THE ELECTRIC SIGNALS MAKING UP JOHNNY'S PICTURE WERE FED INTO THIS GRID, OPERATING IT LIKE A VENETIAN BLIND TO CONTROL THE EXACT NUMBER OF ELECTRONS PASSING THROUGH TO THE SCREEN..."
JOHNNY'S ELECTRON 'PICTURE' CONTROLS GRID


"SO THAT AS THE DIFFERENT AMOUNTS OF ELECTRIC CURRENT HIT THE SCREEN, THEY WERE CHANGED BACK INTO THE EXACT AMOUNTS OF LIGHT WHICH JOHNNY'S IMAGE FIRST THREW ON THE CAMERA-PLATE"
(CONTROL ROOM)
① ELECTRON BEAM SCANS IMAGE--
② WHICH (RECORDED IN RETURNING STREAM) FLOWS ON TO ANODE...
③ THEN, BY COAXIAL CABLE, INTO AND OUT OF CONTROL ROOM--
④ --THEN INTO GRID OF PICTURE TUBE...
⑤ --WHERE ELECTRON BEAM SCANS SCREEN AND "PAINTS" IMAGE IN LIGHT!

AND YOU SAY IT TOOK ONLY 1/30 OF A SECOND TO RECORD MY WHOLE PICTURE ON THE SCREEN?
YES, IT'S HARD TO IMAGINE SUCH SPEED, ISN'T IT? SO FAST THAT WE ACTUALLY SAW YOUR WHOLE PICTURE AT ONCE!

WE EVEN SAW JOHNNY MOVE ON THE SCREEN, ED? HOW DID THAT HAPPEN?
WELL, JANE--YOU KNOW THAT MOVIES, FOR INSTANCE, ARE SIMPLY A SERIES OF "STILL" PICTURES ON FILM, SHOWN SO FAST THEY SEEM TO MOVE...

Koreans regarding the democratic way of life. Unesco is experimenting with comics as one means of increasing international understanding among peoples of many countries.

Parents Magazine has published excellent true comics on the subject of minority groups and racial equality and tolerance entitled *They Got the Blame* and *There Are No Master Races. The Twain Shall Meet,* which *Comic Cavalcade* presented, had the same democratic lesson, the Hawkman fighting for justice to all. *Master Comics* has shown Negroes working with whites on equal terms.

Among the publishers of comic books, the most striking contributions have been made by a former school teacher, M. C. Gaines. Although he originally published the sensational type of comic book, he sold his interest in these books and concentrated on comics which could be used in the schools. His *Picture Stories from the Bible* had 800,000 buyers in its first two years of publication, and *Picture Stories from American History* has also met with remarkable success. The latter is accompanied by a teacher's guide that contains many helpful suggestions for classroom use.

True Comics initially produced a series of very interesting biographies. These "comics" relate in graphic style the childhood adventures, youthful struggles, and mature achievements of men and women prominent in science, social service, and other fields of public life. The life of Clara Barton and of Winston Churchill has been presented in this way. *Classics Illustrated* briefs such literary classics as *Moby Dick, The Three Musketeers, A Tale of Two Cities, Ivanhoe,* and *Robinson Crusoe* in picture script style.

Industrial concerns are another source of worth-while comic-"style" materials. General Motors has produced a series of books on transportation in the United States. General Electric has distributed well over 3,000,000 copies of comic books entitled *Adventures in Electricity, Nuclear Physics,* and *Jet Propulsion* to schools throughout the country. Western Electric has brought out a color cartoon book called *Fun in Science* which contains a pictorial life story of George Westinghouse and twenty simple experiments that boys and girls can perform with easily available materials. Fig. 5.21 shows a series of comics on television.

The above comic-book materials and others of an instructional nature are listed on pages 546–547.

SUMMARY

Graphic materials may be defined as materials which communicate facts and ideas clearly and forcibly through a combination of drawings, words, and pictures. They are particularly well suited to the presentation of information in condensed summary form; the presentation of quantitative information as on graphs; the illustration of relationships as on charts, maps, graphs, and diagrams; and the representation of some kinds of abstractions as in cartoons, diagrams, and maps.

The types of graphic materials commonly employed in teaching include charts, diagrams, graphs, posters, cartoons, and comics. Each type has certain unique instructional applications.

Charts are combinations of various graphic and pictorial media designed to visualize relationships between key facts or ideas in an orderly and logical manner. Typical forms are the tree chart, the flow chart, and the tabular chart.

Diagrams are simplified drawings designed to show interrelationships primarily by means of lines and symbols. Diagrams are highly abstract and have a minimum of detail; hence they require a background of information before they can be used effectively with students.

Graphs are visual representations of numerical data. They show quantitative relationships more effectively than any other medium, but, like diagrams, they require a background of experience and information to be effective as teaching devices. Typical forms are line graphs, bar graphs, and pictorial graphs.

Posters are large-scale simplified pictorial illustrations designed to attract attention to key ideas, facts, or events. They are inherently simple and dynamic. Their function is primarily to motivate, arouse interest, remind, or advertise.

The cartoon is a pictorial representation or caricature of a person, idea, or situation designed to influence public opinion. Political cartoons are sources of information with a strong visual impact based upon sharp, compact drawings and humor of some type. There is some evidence that cartoons are chiefly valuable for teaching at the secondary rather than the elementary level partly because most commercial cartoons are prepared for adult readers.

Comics are a form of cartoon in which the same characters enact a story in a sequence of closely related pictures designed to entertain the reader. Although comics have achieved extensive popularity purely as an entertainment medium, certain materials in this category have definite educational values. Their extensive use of colorful illustrations, of a rapidly moving story, and of realistic people as characters appeals to students of all ages. Comic books are being used effectively by teachers to arouse interest, to develop vocabulary and reading skills, and to serve as springboards into broader reading interests.

Suggested Activities

1. Analyze typical units of work in your teaching field and prepare a list of points at which graphic materials would provide unique teaching values.
2. For a specific unit of work in your teaching field in which graphic materials are applicable, develop a lesson plan incorporating graphics, teach it, and report your results to your audio-visual class.
3. Divide the class into committees and have each committee select and evaluate the best examples it can find of one type of graphic material. Consider such points as (a) standards to be observed in selection, (b) sources of suitable materials, and (c) costs.
4. From the members of your class, obtain charts, graphs, diagrams, posters, and cartoons prepared by elementary and high-school pupils. Investigate the learning situation in each case and attempt to assess the educational values derived. Through group discussion formulate a set of principles which will be helpful in determining when and to what extent pupils should prepare graphic materials.
5. Make a committee survey of comic-book materials being sold at key newsstands in your community. Find which comics are best-sellers, which are objectionable (and why), and which are useful from an educational standpoint. Prepare suitable graphic materials to use in presenting your findings.
6. On the basis of the information secured for the preceding survey, draw up a P.T.A. program to consider the comic-book situation in your community. Plan the program so as to include both pros and cons in the discussion.
7. Have a committee of class members investigate sources of free or inexpensive graphic materials, prepare an exhibit of sample materials, and make classified lists of sources for distribution to your class.

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6. The Tackboard and Study Display

What would be the reaction of children if one morning, when they came into their classrooms, they found that the walls had been stripped of everything, and that nothing at all remained on them or on display areas and on tackboard or chalkboard surfaces?

"An art class assembled one morning to find the room stripped of its customary decorative arrangements. Everything except the necessary chairs and tables had been removed. The barren setting and uninspiring atmosphere left the pupils amazed and disturbed. Accordingly, what had been an unnoticed background [now] became a matter of importance to them."[1]

Consider the pupil as he goes from classroom to classroom. Early in the morning he may attend a class in arithmetic. Next he goes to industrial arts and from there to a language class. At the end of the day he reports to the history room.

That student has many adjustments to make. His identification with arithmetic must be suddenly set aside as he leaves that class, and as he approaches the next class all his energies must quickly be concentrated on picking up the threads of another subject. It is desirable that as many visible evidences of a given study situation as possible be reflected in the displays on walls, tackboards, or bulletin boards in each classroom situation which the learner enters.

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[1] Lucien Kinney and Katharine Dresden, *Better Learning Through Current Materials*, Stanford University Press, Stanford, 1949, p. 107.

DEFINITION OF THE TACKBOARD

The tackboard (bulletin board, wall display, or study display) is a device for displaying to learners graphic, photographic, or other study materials. It is used to present current classroom work in visualized form.

Tackboard study displays may include drawings, themes, diagrams, photographs, and three-dimensional objects, or any arrangements of these which are pertinent to the general areas of classroom study and learning activity.

The kind and amount of tackboard space needed depends on the activity in progress. "Bulletin board or tackboard space can be used in almost any quantity by the most resourceful teachers. It should be light in color and durable; and all or most of it should be placed at the pupils' eye level. Part of the tackboard may become an easel, moved to a slight angle with the wall to facilitate painting and drawing. Occasionally a whole interior wall, or part of a wall, from floor to ceiling, is covered with soft wood and becomes an 'exhibiting wall' that encourages large group projects and display of pupil work."[2]

FUNCTION OF THE TACKBOARD AND STUDY DISPLAY

Too often the bulletin board or tackboard is used for no other purpose than to display announcements of forthcoming events, safety regulations, and other general information. Although this use is necessary, it must not be confused with the true teaching function of the tackboard.

The hall display case which frequently exhibits outstanding work done in health education, arithmetic, art, or the social studies is an essential part of the school's display work; but it is not to be thought of as a functioning teaching display area.

Although all these types of display—the administrator's display, the observation of special events, and exhibits of individual class accomplishment—are an integral part of the school, the following discussion will concern tackboard study display techniques that are useful in the improvement of day-to-day classroom teaching situations. The goal will be to show that the *teaching tackboard display* can become a valuable and integral part of learning activities in the classroom.

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[2] *Guide for Planning School Plants,* National Council on Schoolhouse Construction, Nashville, 1949, p. 45.

SELECTION AND LOCATION OF THE TACKBOARD

Even limited observations of classrooms in today's school buildings reveal too little space for bulletin boards or displays. The usual classroom is too often a clutter of doors and windows, service and ventilating outlets, and large areas of inflexibly installed chalkboards. Too often the tackboard display is relegated to out-of-reach locations above chalkboards or to poorly lighted space between windows.

This, of course, need not be the case. In the well-planned classroom a major part of the eye-level wall area is given over to tackboard display space (Fig. 6.1). The best location for this display area is near or adjacent to the part of the room which is used as a workshop; this is frequently the rear of the room. The space should extend from approximately 30 inches above the floor to as high as the extended arm can reach easily. This will vary with the age of the child. In general, a display surface is of little use if it offers less than 3 feet of vertical working space. The horizontal dimensions are limited only by the size of the room.

Small bulletin boards—3′ x 4′, for example—are rapidly being discarded. Permanently installed *large* tackboards should be an integral part of every classroom today. One very effective material for tackboards is composition corkboard mounted on a heavy burlap-like backing for strength and retention of shape. This is available from commercial sources ranging from the local lumber supply company to school supply distributors.[3] This or a similar material is installed in most classrooms as a permanent display surface.

Although some tackboard space is provided in most classrooms, there are times when additional space is needed. Most teachers are concerned with how to provide this additional space. This can be done in any of several ways:

1. Unused wall or chalkboard areas can be hung with coarse, loosely woven cloth or strong paper suspended from a light but strong wire stretched along the top of the chalkboard. Cloth gives a good sur-

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[3] Beckley-Cardy Publishing Co., 1632 Indiana Ave., Chicago, Ill.; American Crayon Co., Sandusky, Ohio; New York Standard Blackboard Co., Inc., 144 W. 18th St., New York, N.Y.

VISUAL FIELDS

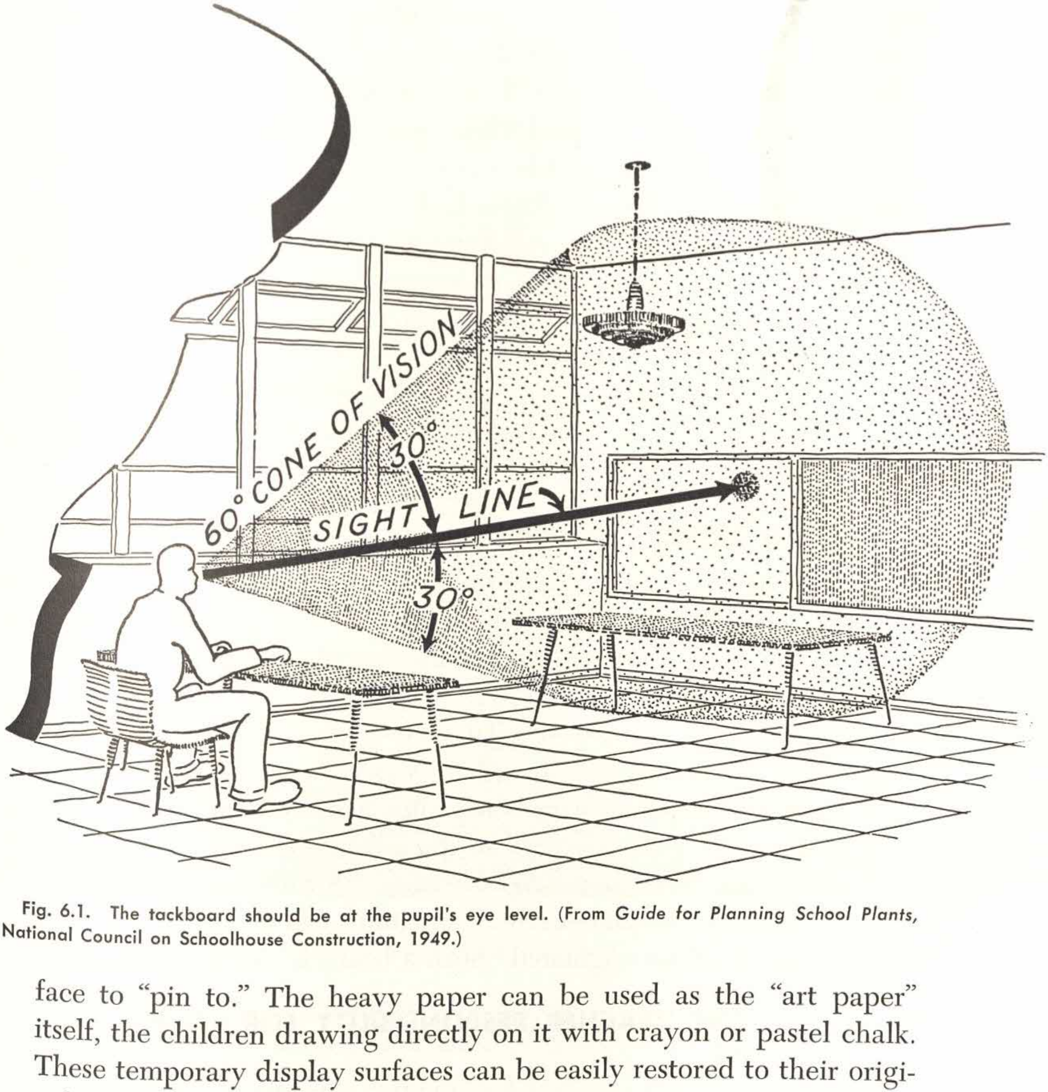

Fig. 6.1. The tackboard should be at the pupil's eye level. (From *Guide for Planning School Plants,* National Council on Schoolhouse Construction, 1949.)

face to "pin to." The heavy paper can be used as the "art paper" itself, the children drawing directly on it with crayon or pastel chalk. These temporary display surfaces can be easily restored to their original uses.

2. Small areas up to 4′ x 6′ can be converted to use as tackboards by attaching to them soft wood, or a plywood veneer which has been covered with an inexpensive, loosely woven, neutral-covered material. Cloth can be glued to the veneer; or if only a temporary surface is to be provided, it can be stretched over the edges of the veneer and tacked lightly to the back with small tacks.

3. Cloth-covered pine-strip "grids" can be used when large areas are required for display purposes. The entire back wall of the classroom can be inexpensively converted in this way. White pine or some other strong but light softwood in 2″ x ½″ strips about 4′ in length is suitable. Arrange these in a grid which is spaced at 12″ intervals.

   Make the grid firm by driving two or three brads or tacks into the wood at each intersection. These grids can be covered with light cloth to improve their appearance. They can be moved easily from place to place, leaned against the wall, set upright in the chalk rail of the chalkboard, tacked to wooden moldings, or hung from a map rail or from hooks suspended from moldings.

   Art materials, handwriting specimens, project pictures, and other study materials can be attached to this grid by means of thumbtacks or common pins.

THE FELTBOARD DISPLAY

The fact that hair, wool, and cotton felt will adhere to like surfaces has long been used in classroom work. Today a feltboard, either homemade or produced commercially, presents a splendid opportunity for the enrichment of classroom teaching techniques.

A feltboard is a felt-covered flat surface. Felt is stretched and then glued to wood veneer, pressboard or Masonite, or heavy cardboard to make a feltboard. Letters, words, and cutouts made from felt, when placed on it, will stay in place because of the adhering quality of felt for felt. The cutouts can be made in school or obtained from commercial sources. With them clever display-teaching situations can be devised and many useful teaching ideas originated.[4] Such a board is shown in Fig. 6.2.

PUPIL AND TEACHER RESPONSIBILITY FOR TACKBOARD DISPLAYS

While the care and arrangement of hallway display cases, special-event bulletin boards, and administrative announcements can be organized on a calendar basis, with specific individuals responsible for specific dates, this is not feasible for the classroom teaching display. Because the subject matter of study displays is directly identified with classroom progress, and because most classroom responsibility revolves about the pupil, account-

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[4] *The Feltboard in Teaching*, Sound, Color, 10 min., Wayne Univ., Detroit.

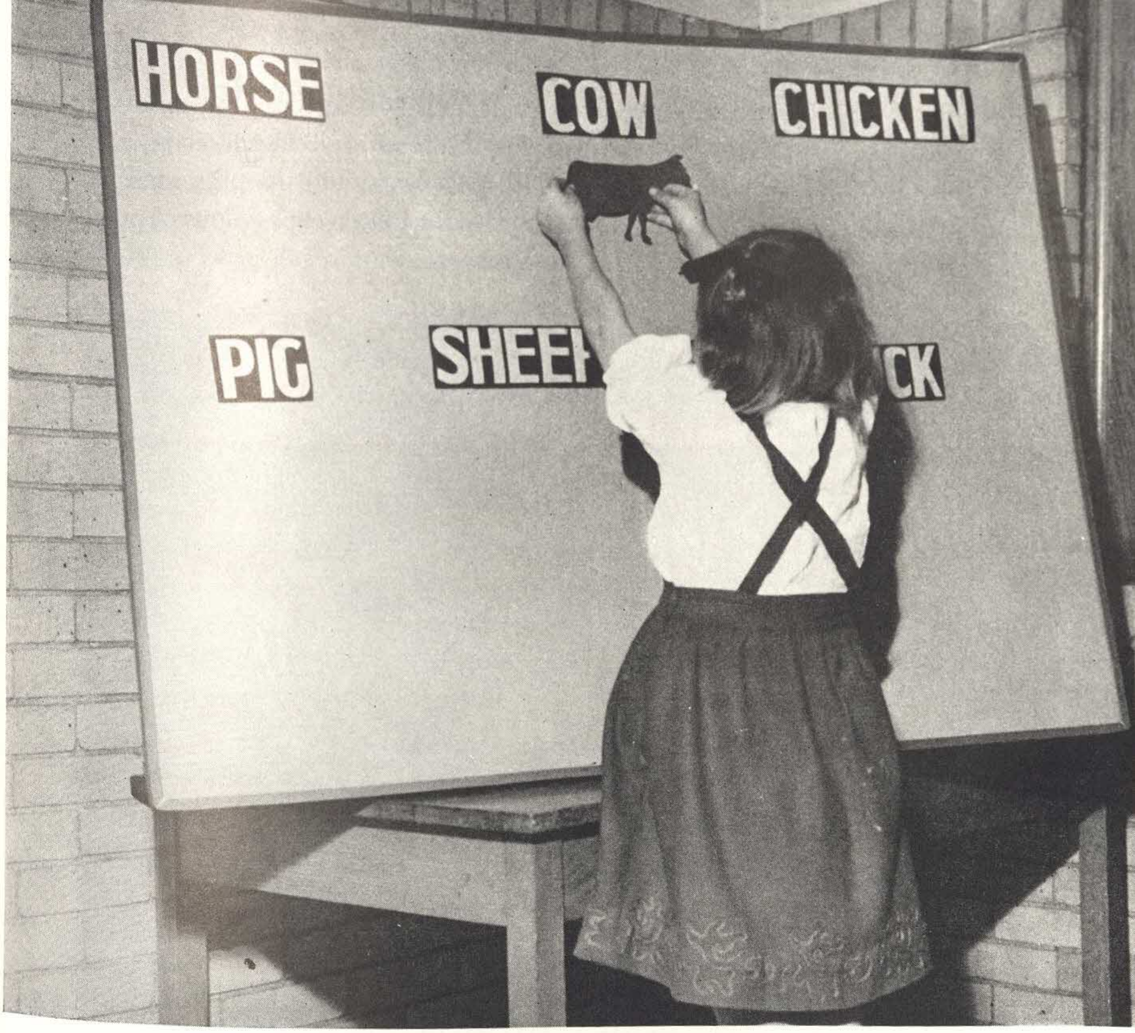

Fig. 6.2. Feltboard teaching devices are limited only by the teacher's ingenuity. Great flexibility is an inherent advantage of the feltboard. (Courtesy of Wayne University.)

ability for planning and arranging these learning devices should be placed as directly as possible on pupils or pupil committees.

Individual pupil interest, initiative, and responsibility are the true bases for tackboard and display area activities. The child who likes to "comb" newspapers and magazines for information relating to subjects currently being studied should be encouraged and should be on the current events display committee.

The child who is artistically inclined, who is interested in color, design, and form, should be an effective member of the bulletin board planning committee. This group can mount pictures, prepare original diagrams, etc. Pupil ability and interest may give clues to participation on other committees. The teacher who knows the interests and capacities of individual pupils and correlates these with the opportunities presented by study display work is creating opportunities for better expressions of pupil initiative.

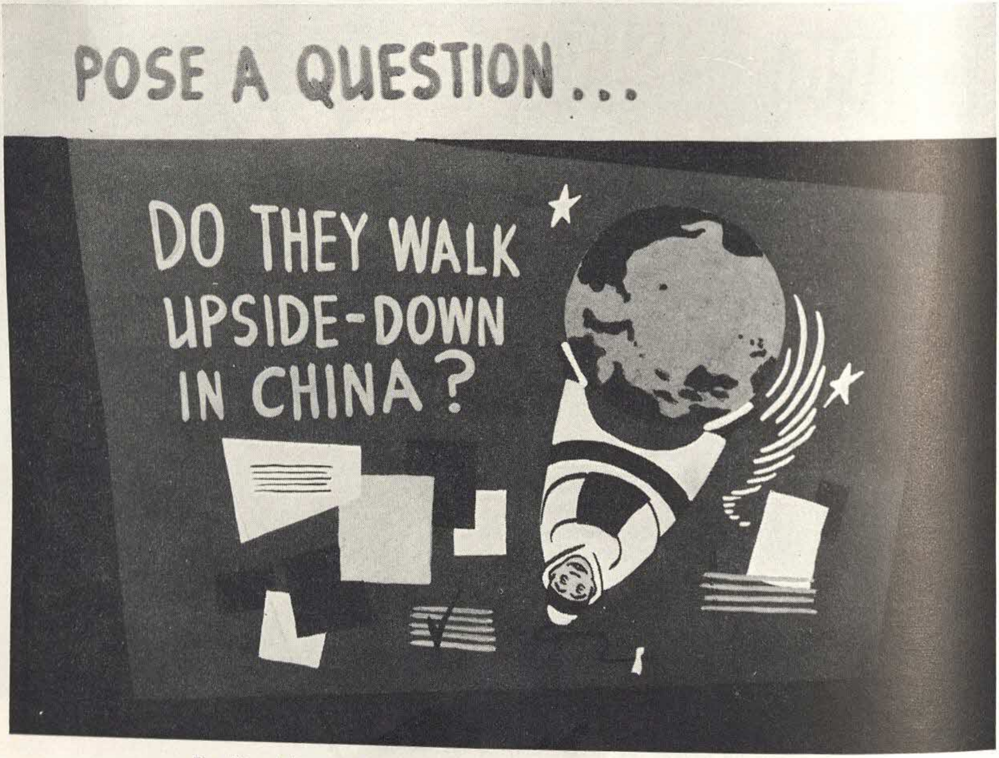

Fig. 6.3. (This and Fig. 6.4 courtesy of Teaching Aids Laboratory, Ohio State University.)

A group of teachers in Wilmette, Illinois, devised a method of maintaining an accumulating file of tackboard pictures. Each teacher was given a metal file in which study materials were stored under appropriate subject and unit headings. This file provided ideas for bulletin board arrangements. If key materials are put on the tackboard and a portion of it is left blank, few pupils will fail to respond to the challenge the blank space offers. After the teacher talks about completing the display, the children will hunt everywhere for interesting things to add to it. No teacher should expect that his group of pupils will be ready-made creators of study displays.

TACKBOARD AND DISPLAY SUPPLIES

Needed supplies for tackboard and display work should be available in every classroom. These include artcraft paper, rolls of plain brown wrapping paper, pastel chalk, wax crayons, water colors, wire, tacks, pins, adhering wax, and oiled paper for use as stencils.

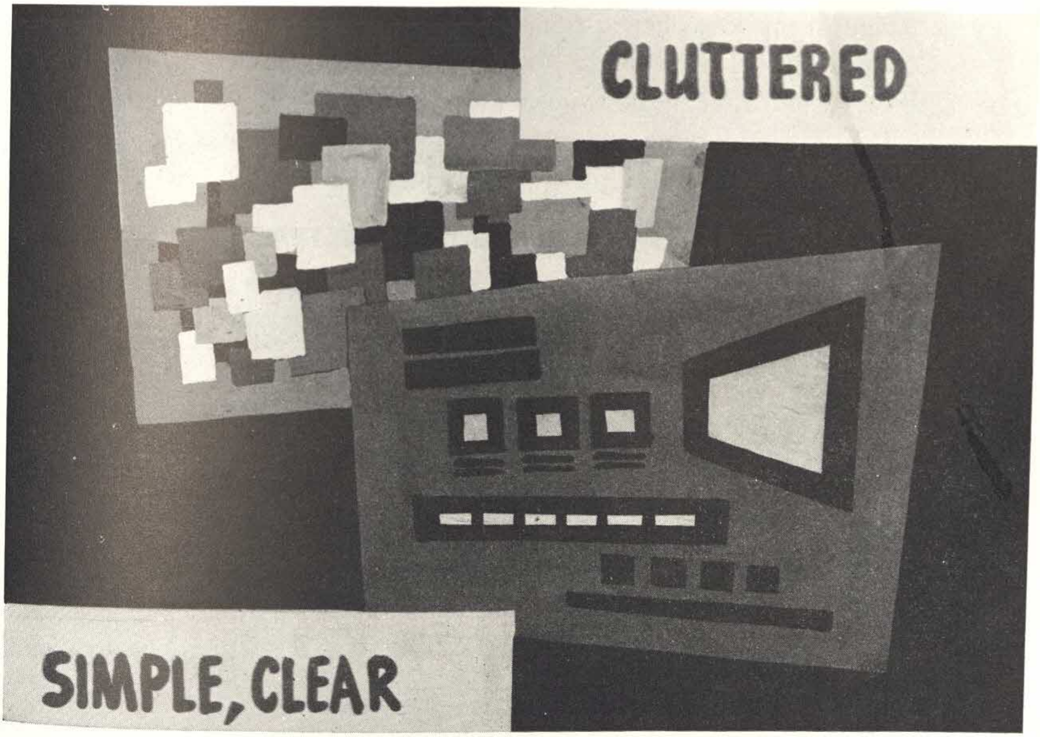

Fig. 6.4.

Additional supplies include three-dimensional cardboard and ceramic letters. Words and phrases can be made with these letters.[5]

ARRANGING THE STUDY DISPLAY

Although no one wants to follow the same plan in arranging displays, certain basic principles of display arrangement may be stated. Each teacher-pupil group should consider these, but apply them as their particular needs indicate.

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[5] Redikut Letter Company, 2902 W. 76th St., Los Angeles, Calif.

1. State the purpose of the display. Give it a name, a headline. This heading should state the central idea. Be dramatic. Ask a question (Fig. 6.3), pose a problem, make a direct claim or statement.
2. Visualize the display. If the subject can be described graphically, the display is the place to do it. The pictures, graphs, diagrams, or models used in it should all help to bring about further understanding of the central purpose of the display.
3. Arrange the parts of the display dramatically and attractively (see Fig. 6.4). Take a cue from modern magazine and newspaper layout.[6] Use attractive groupings. Have plenty of open space. Avoid a "rank and file" mounting of pictures or objects. Use color.

TACKBOARD STUDY DISPLAYS THAT TEACH

Teaching tackboard displays fall logically into three general categories: those which motivate, the work type, and those which represent the cumulative efforts of the class group.

TACKBOARD DISPLAYS WHICH MOTIVATE

In arranging a motivational display, the teacher will often find it necessary to locate most of the materials himself. These may be secured from school library files, from his own classroom file of key subject materials mentioned above, and from other sources. The goal is not to present a ready-made or complete display, but to incite interest. At first the contents of the display may be largely a collection of work done previously by pupils and teachers.

A secondary-school art instructor displayed the actual objects which constitute the working tools for one kind of art activity. They were attached to the display surface with a mastic material[7] which offers untold new opportunities in creating attractive, attention-arresting wall displays. This three-dimensional exhibit (see Fig. 6.5) included inks, wax crayons, cutting tools, hacksaw, pens and penholder, showcard pigments, and basic artcraft paper, all of which were to be used in actual classwork. Above them was the simple question, "What can you make with these?"

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[6] For further and more detailed discussion of layout, see pp. 82–83, 222–224. A good filmstrip on this subject is *How to Keep Your Bulletin Board Alive,* 32 frames, Silent, Color, Teaching Aids Laboratory, Ohio State Univ., Columbus; $2.50, including manual.

[7] Bulletin Board Styx, Lea Audio-Visual Service, Albert Lea, Minn.

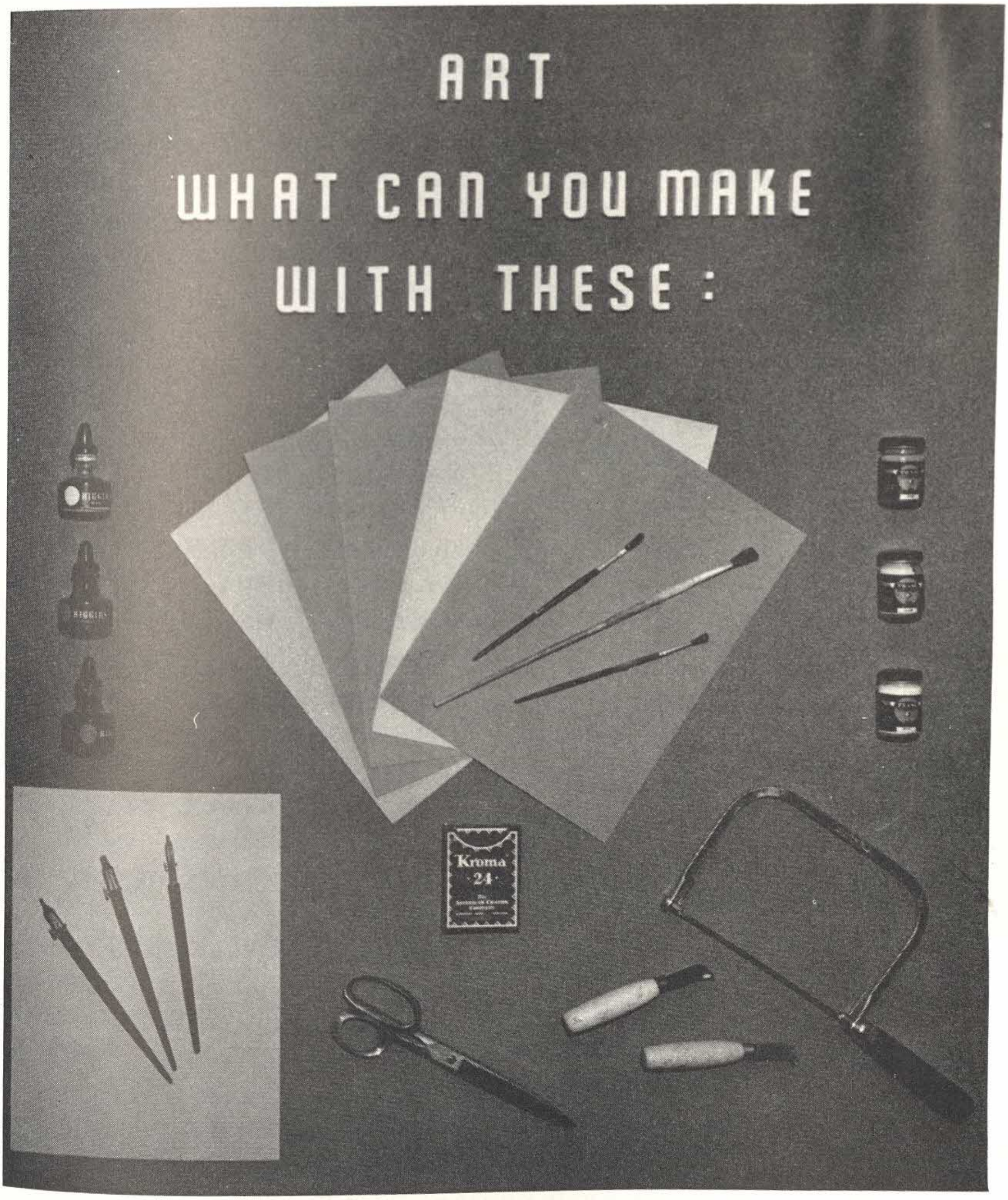

Fig. 6.5. Real art supplies are used in this display.

Needless to say, after some preliminary discussion, most of the students had many ideas about what they wanted to do. First, of course, they had to learn to manipulate the materials; but they were motivated.

Several days before beginning a junior-high-school unit on the petroleum industry, a teacher displayed on the tackboard several pamphlets and actual three-dimensional sample bottles of petroleum products. He asked the pupils: "Will you be on the alert for more interesting material, pictures, etc., about petroleum? If you find anything interesting, will you bring it in?" The students were interested—so much so that before the actual unit began, news clippings, additional specimens, and pictures of petroleum products and the petroleum industry were brought in to supplement the core display.

A high-school mathematics teacher periodically posted a single but unusual problem which was displayed diagrammatically. These problems never failed to attract a knot of curious students, who would be pondering such a question as: "Which of the one-pound candy boxes would require the shortest length of ribbon to tie it once around each side?" In this case, three beribboned boxes of varying size but identical volume were attached to the tackboard below the question.

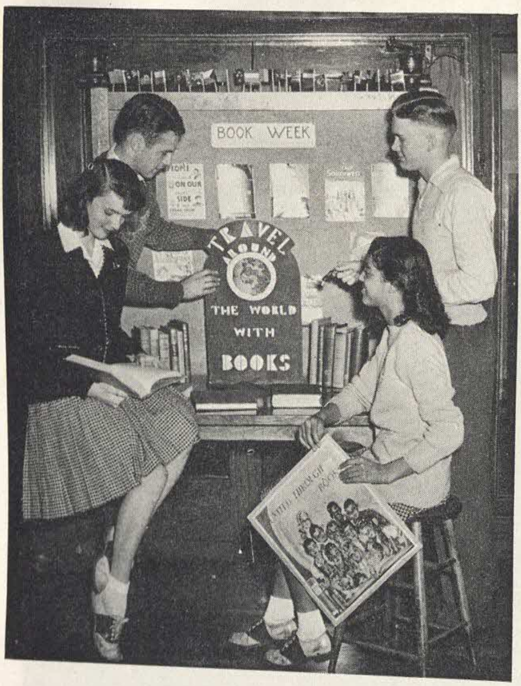
BOOK WEEK
TRAVEL AROUND THE WORLD WITH BOOKS

Fig. 6.6. (Courtesy of Waterloo, Iowa, Public Schools.)

The Book Week display illustrated in Fig. 6.6 is intended to stimulate curiosity. The display is closely connected with the books about which the teacher wanted to arouse curiosity.

A civics teacher who anticipated difficulty in capturing the imagination of her ninth-grade class for a thoroughgoing study of the United Nations sought the help of interested students. They arranged a tackboard display that was studded with questions about the United Nations and immediately caught the interest of the class as a whole. This display is shown in Fig. 6.7.

A science teacher posted a vocabulary list each week. Beside this list he put cutout magazine illustrations so that students could match words and pictures—a combined picture-dictionary, so to speak. A primary-grade social studies teacher mounted photographs relating to the wildlife in far-off places, thus capitalizing on the opportunity to arouse the curiosity of young learners.

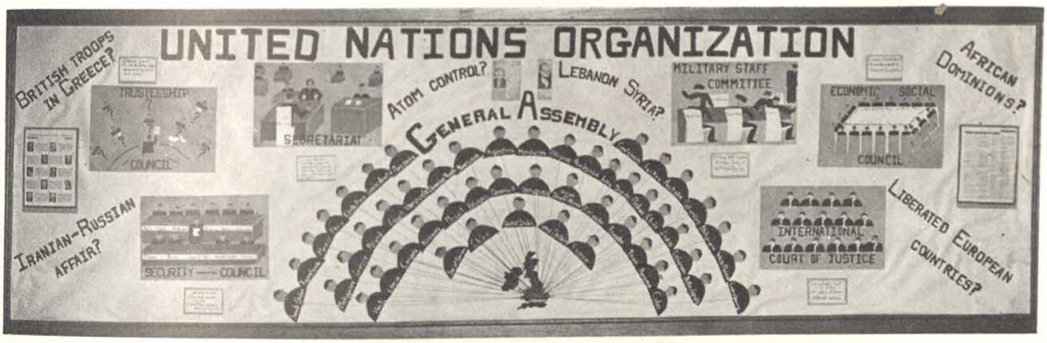

Fig. 6.7. This student-arranged display aroused interest in the United Nations. (This and Fig. 6.8 courtesy of Madison, Wisconsin, Public Schools.)

The motivational tackboard can become an "open sesame" to new areas of information that are eagerly sought by students. Its possibilities are limited only by the imagination of the teacher.

THE WORK-TYPE DISPLAY

The work type of display is of the greatest value when undertaken initially and kept up continuously by pupils. These displays should be directly related to the progress of the class as it goes through the various stages of the learning process.

The work-type display may begin with actual study materials and proceed through the trial-and-error formulation of procedures, questions for study, and techniques for continuing the search for information. This type of display is always closely allied to general work progress.

As was said above, the value of the work-type tackboard lies in its being planned and created by the pupil. The display panel in Fig. 6.8 reveals the needs of a first-grade child. Having visualized her understanding of simple monosyllabic words, she displays her ability to match the visualization with the abstraction, the word which has the correct meaning.

At the primary level displays built around nouns, action words, and colors offer incentive and pride of achievement to the young learner. The work-type tackboard display is most effective when it gives evidence of

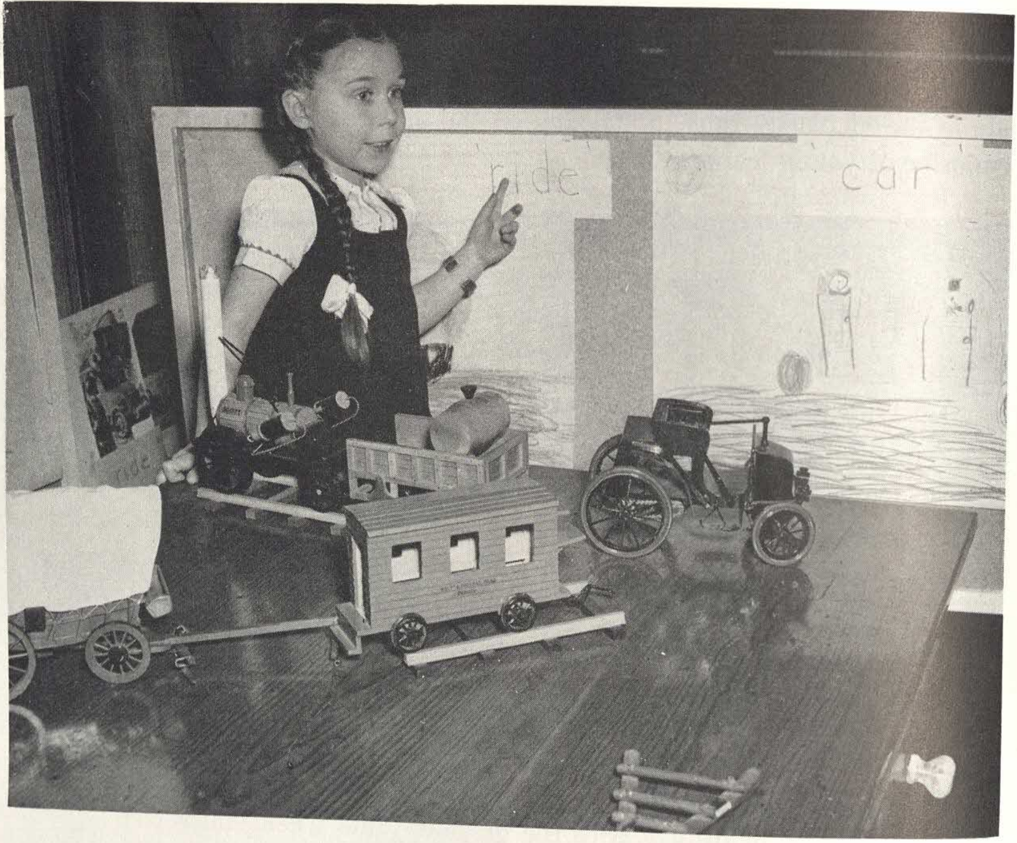

Fig. 6.8.

ideas and information which are closely related to or actually grow out of the subject being studied.

In language arts situations, study materials such as newspapers, magazines, maps, charts, and wall displays supplement one another as the children seek to interpret the news in terms of geographical areas and social groups. In Fig. 6.9, junior-high-school pupils are collecting materials and doing simple background research work for the "data" around which a "newscast" on events of the day will be built.

When the work-type tackboard is used to record class progress, the group's decision on the main problem to be studied may be prominently displayed on the tackboard. As subproblems are developed in class discussion, they also are included. Evidence of the continuing search for information in books, periodicals, audio-visual materials, interviews, etc., can be systematically added. The tackboard in Fig. 6.10 is a cumulative but not yet complete record of the progress which this class has made.

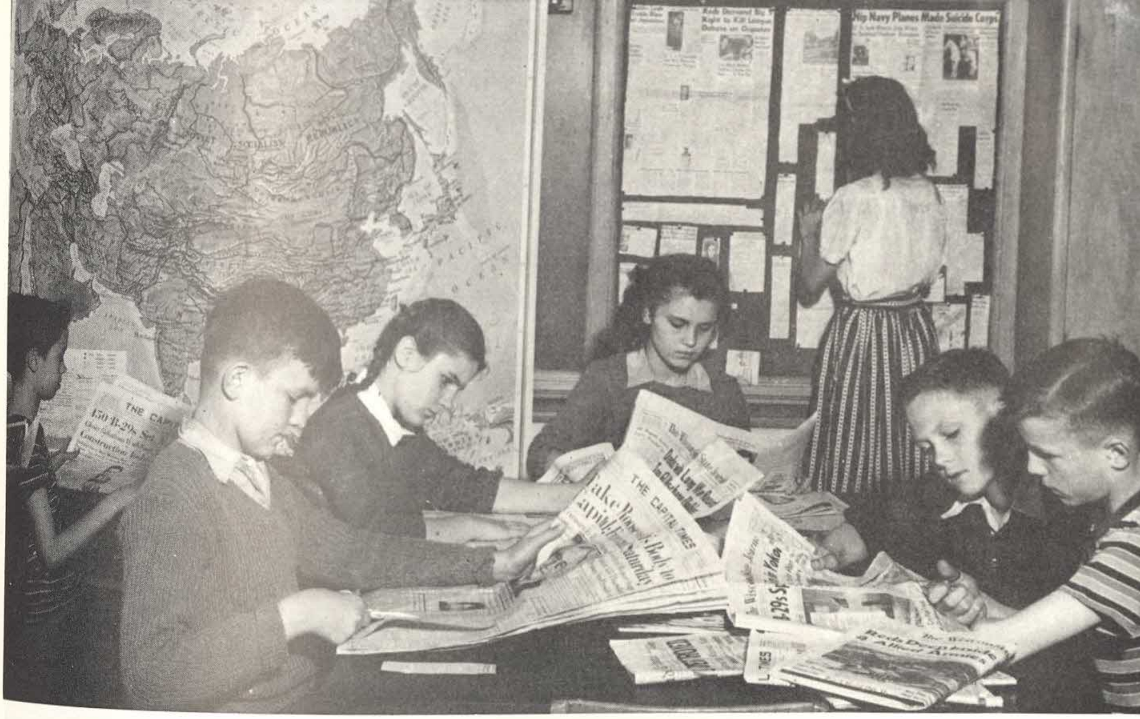

Fig. 6.9.

The work-type tackboard can be used whenever motivation can be developed—in any classroom situation, at any level, and in any subject. Display areas can be expanded, if necessary, by using another wall area

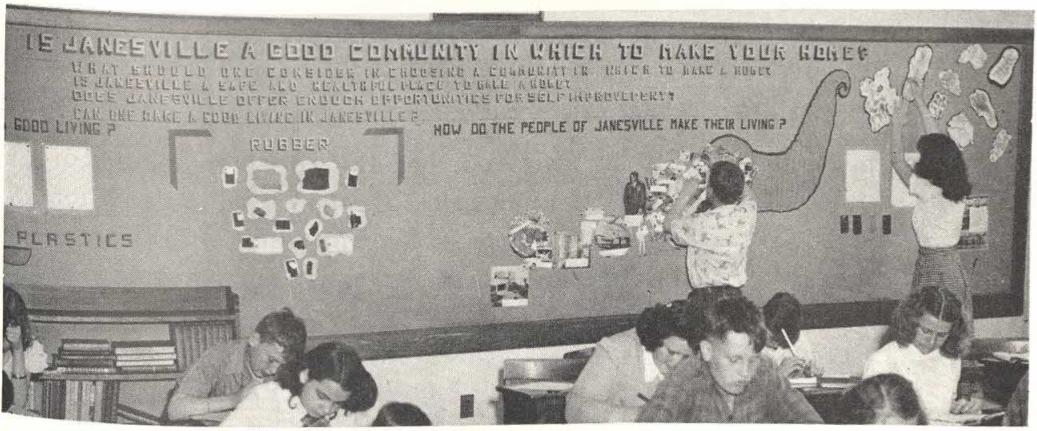
IS JANESVILLE A GOOD COMMUNITY IN WHICH TO MAKE YOUR HOME?
WHAT SHOULD ONE CONSIDER IN CHOOSING A COMMUNITY IN WHICH TO MAKE A HOME?
IS JANESVILLE A SAFE AND HEALTHFUL PLACE TO MAKE A HOME?
DOES JANESVILLE OFFER ENOUGH OPPORTUNITIES FOR SELF IMPROVEMENT?
CAN ONE MAKE A GOOD LIVING IN JANESVILLE?
GOOD LIVING?
RUBBER
PLASTICS
HOW DO THE PEOPLE OF JANESVILLE MAKE THEIR LIVING?

Fig. 6.10. (Courtesy of Janesville, Wisconsin, Public Schools.)

temporarily. This type of tackboard can become an integral, closely associated record of progress of the day-to-day work done in the modern classroom.

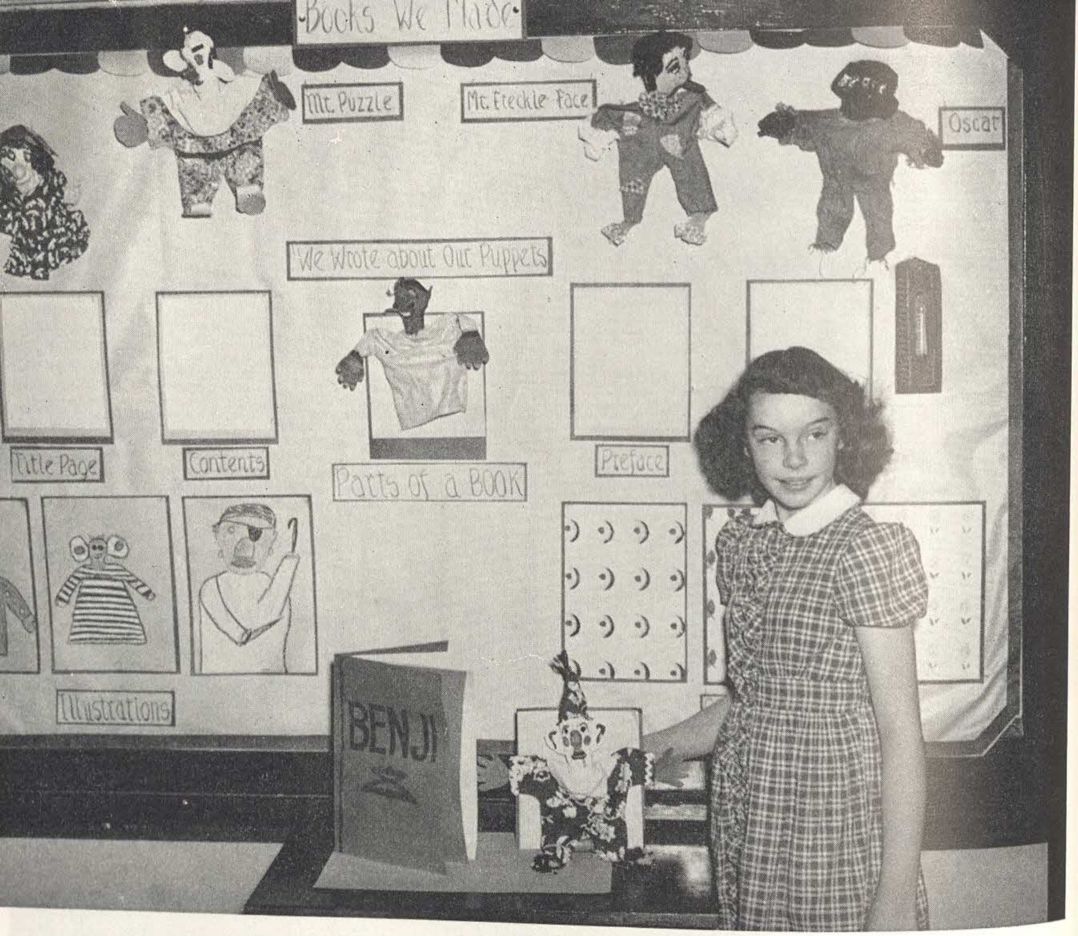

Fig. 6.11.

THE CULMINATIVE TACKBOARD DISPLAY

The culminative display "pulls together" the work accomplished over a period of days or weeks; it summarizes the end products of a unit of work. Any good workman wants to see the end result of his labors. It is in this capacity that this type of display serves as a summarizing, evaluating, or concluding record of the work done.

In a junior-high-school class the motivational activities revealed a need for information about soil erosion. In order for the pupils to understand erosion, certain subquestions had to be included. It was necessary, for example, to know about the action of wind, water, ice, snow, and sun on the earth's crust. After days of study, information gained from many sources was brought together. Answers to initial questions were put on the display as a culminative activity. A mural was prepared as a coöperative effort, each child recording his answers to the particular problems of erosion into which his interest had led him.

A study of books and printing naturally led sixth-grade children to gather information in allied fields. They wrote, illustrated, and finally bound a "book" of their own about a family of puppets. How they did this was told in display form (Fig. 6.11).

How do people of other lands live? What effect do animals have on the lives of people who live in various climates? The opportunity to show these relationships led an entire class to collect information and materials for a display, each in terms of his own interests.

The degree to which all the children participate will depend on individual ability. However, unless everyone contributes in some degree, the display activity cannot be carried to its highest level of development. A good classroom study display represents the entire group's thinking, planning, and developing.

EVALUATING THE TACKBOARD DISPLAY

Tackboard study displays are the outgrowth of the need for visualizing the initial steps, progress, and final achievement in classroom activities. Because of their importance in teaching situations, the creation of tackboard displays is likely to be time-consuming. In order to make sure that the expenditure of time for this purpose is commensurate with teaching outcomes, both pupils and teacher should critically evaluate the tackboard in terms of its effectiveness as an experience in learning.

Tackboards must be useful in the teaching process. Regardless of the care and effort that have gone into them, tackboard displays should be dismantled once their usefulness is past. Tackboard techniques should be constantly under scrutiny, and opportunities for improvement continuously sought. Lettering, phrasing, clever arrangement should all be considered when the teaching tackboard is evaluated.

The following evaluation scale is suggested as a measuring instrument which can be used by teacher and pupil as they attempt to answer the question, "Has our classroom tackboard been effective in helping us become interested and effective learners in doing a given unit of work?"

Display Content

1. Did the information on our tackboard help us in our study of the subject we were pursuing? Yes .... No ....

2. Did our tackboard bring us information above and beyond that which we could have got through more accessible, more easily available channels? Yes .... No ....
3. Was our tackboard display planned and executed by ourselves to the maximum degree possible? Yes .... No ....
4. Were all the pupils encouraged to help in the creation of the tackboard display, each in terms of his own interest and ability to contribute? Yes .... No ....

Mechanics

1. Were attractive headings, captions, phrases, etc., used to identify display objects and illustrations? Yes .... No ....
2. Was the tackboard artistically balanced? Yes .... No ....
3. Was it uncluttered? Yes .... No ....
4. Was it organized around a focal point of interest? Yes .... No ....
5. Were strings or tape, arrows, or other directional devices neatly and carefully placed? Yes .... No ....
6. If humor was possible, was the cartoon technique used? Yes .... No ....
7. When photography was possible, was it used? Yes .... No ....

For the Teacher

1. Do I maintain a file of photographs and other valuable pupil-created material for future use in motivational tackboards? Yes .... No ....
2. Are the basic tackboard materials—colored paper, tape, pins, mastic materials, etc.—readily available to my pupils? Yes .... No ....
3. Have I drawn a simple layout of a good tackboard to be filed under the appropriate unit of work so that a year from now I can improve on it as my pupils and I discuss means for preparing display work? Yes .... No ....

SUMMARY

A tackboard (bulletin board) is a device for the classroom display of graphic materials which are closely related to the interests and study responsibilities of learners.

Tackboard surfaces may be commercially produced corkboard, softwood, pressboard, veneer, etc. Temporary surfaces may be improvised from wooden grids covered with cloth or coarse wrapping paper. To be effective, the tackboard should be placed at eye level and offer a large expanse of working space.

More important is the use to which the tackboard is put. It is best used as a surface on which pictures, specimens (flat and three-dimensional), examples of student work, and all other kinds of related graphic study materials may be displayed in the classroom.

Graphic study materials which are interesting, descriptive, and clarifying and which supplement other information sources closely related to classroom activities can be arranged in one of the following ways:

1. The motivational study display, which asks questions, presents problems, exhibits pictures, photographs, or specimens of unusual objects, or otherwise presents situations which attract learners and arouse their curiosity.
2. The developmental study display, which records pupil planning and progress. This display offers wide opportunity for pupil initiative and responsibility. Its content may range from brief statements of plans to pictorial or other graphic evidence of progress in a unit of work or the solution of a problem.
3. The culminative study display, which presents a complete graphic record consisting of charts, explanations, photographs, pictures, models, and specimens. The visualized outcomes of a completed study problem or project may be organized in such a display.

Arranging pictures into artistic groups, mounting three-dimensional specimens or models skillfully, using clever attention-arresting headings and colors, etc.—all are part of creating an effective study display.

The study display should not be a teacher-dominated classroom project; rather it should be the outgrowth of pupil-teacher planning. It should reflect a maximum of pupil initiative and creative participation.

Suggested Activities

1. Begin to accumulate a file of photographs, diagrams, illustrations, specimens, etc., which will be useful in creating motivational study displays for the subjects you teach or will teach.
2. Help pupils plan and make a study display. In terms of known pupil interests and abilities, help small groups of children define how they will locate materials for the display. Organize such committees as these (if they are appropriate):
    a. Specimen collectors.

   b. Picture locaters and mounters.
   c. Caption makers.
   d. Diagram drawers.
   e. Original artwork creators.
   f. Reading researchers and authenticators, etc.
3. Visit your colleagues' classrooms. Examine study displays and judge their effectiveness, using the evaluation form on page 153. Make rough sketches of those which you feel are outstanding; give reasons for your judgment.
4. Offer to help provide additional temporary tackboard space in a classroom which needs it. Ask the manual arts teacher or the building custodian for light 2″ x ½″ lath, or assemble simple materials and construct a grid-type tackboard.

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The Feltboard in Teaching, Sound, Color, 10 min., Wayne University, Detroit.

7. Globes and Wall Maps

"The airplane changes the world map."

This is the title of a film. But more than that, it is a development which has, perhaps, been more responsible during recent years than any other single factor for the changed world relationships in which we find ourselves. The countries of the world are now closer together in time than were many of our own states after World War I (Fig. 7.1). By 1943 no point on earth was more than 60 hours by air from any American airport. With the jet transport, flight time can be expected to be reduced by at least another third.

The "shrunken" world concept is indeed fascinating, but its real significance must not be overlooked. The smaller world in which we live today is full of challenges—challenges from both wider opportunity and greater problems than we have ever before had to face. Inherent in them is the necessity for a better geographical understanding of the world if men are to learn to live together in continuing peace and prosperity. It is not enough for a few oldsters to know the world as it exists today; the task is one involving generations. Children must know that the biggest part of the job will be theirs.

A full understanding of nations and people must be based upon a clear understanding of the geography of those nations and peoples. This in turn requires, among other things, a functional knowledge of globes and

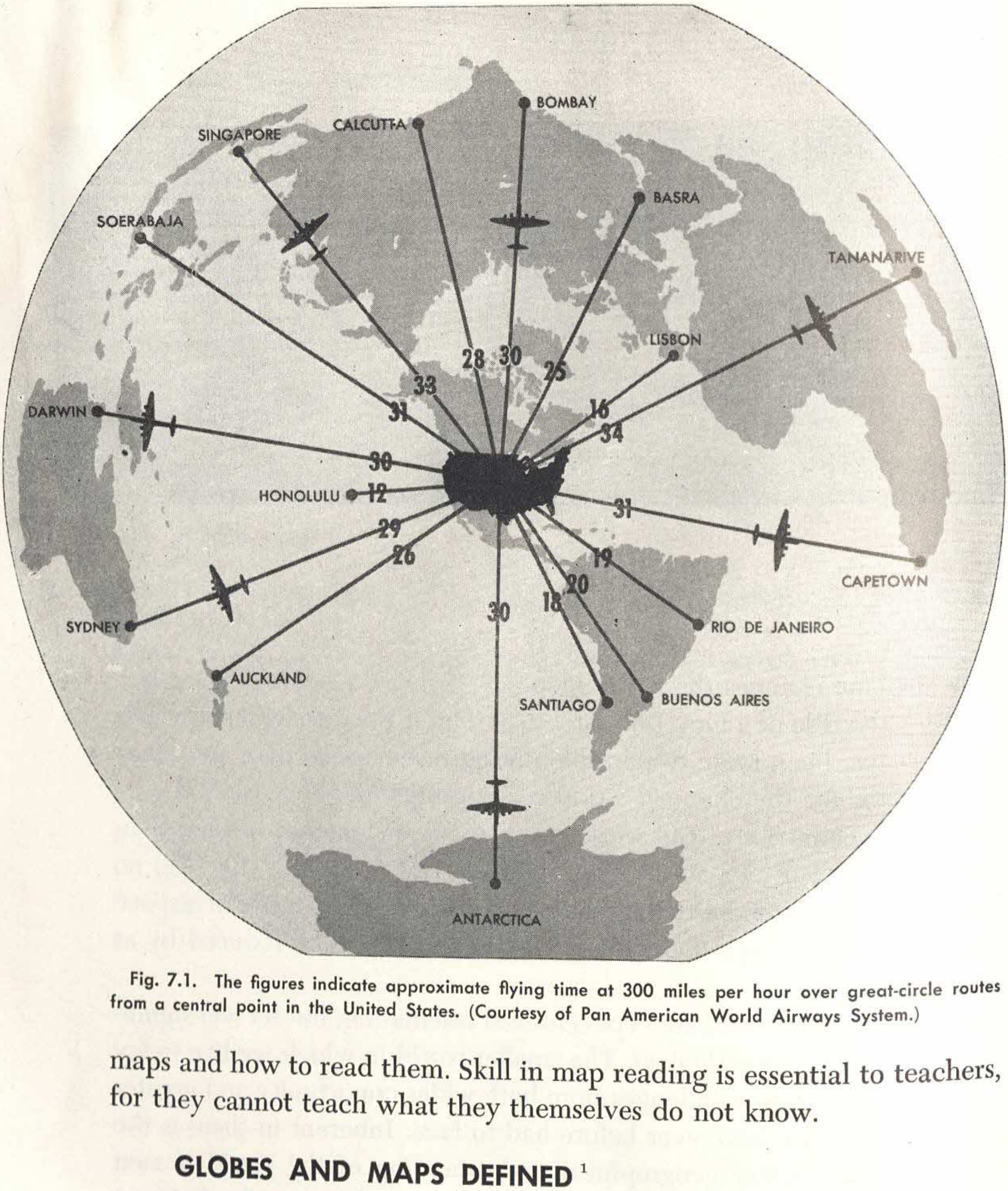

Fig. 7.1. The figures indicate approximate flying time at 300 miles per hour over great-circle routes from a central point in the United States. (Courtesy of Pan American World Airways System.)

maps and how to read them. Skill in map reading is essential to teachers, for they cannot teach what they themselves do not know.

GLOBES AND MAPS DEFINED[1]

Globes are spherical models of the earth. Globes represent a more correct concept of the surface of the earth because the earth is a sphere.

Maps are flat representations of the earth's surface which convey information by means of lines, symbols, words, and colors. Maps vary widely in type and content according to their purpose. There are picture maps, weather maps, physical maps, political maps, navigation maps (called "charts"), rainfall maps, population maps, historical maps, natural-resources maps, sales maps, advertising maps, vegetation maps, and geodetic survey maps, to name only a few. The political-physical maps commonly found in classrooms are designed to show such information about a particular region as its area, shape, location, political subdivisions, and certain features of its topography.

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[1] Because maps are modified or flattened representations of the earth's globe-like surface, introductory explanations of globes and maps, and basic comparisons, will be given now. In later pages globes and maps as such will be described in detail.

It is important for anyone studying geographical concepts to use a globe along with flat maps. The latter are essential in working with groups for the following reasons: (1) Most globes are too small to provide sufficient details that can be readily observed by the whole class. (2) The entire world cannot be seen at one time on a globe, whereas it can be seen at one time on a flat map (though not without distortion). (3) Flat maps are available for numerous special purposes such as the study of trade routes, climatic conditions, and the distribution of natural resources.

CHARACTERISTICS

The representation of geographical concepts on maps and globes involves consideration of four principal factors: direction, distance, shape, and area. One practical method of evaluating the properties of any map or globe, as will be shown later in this chapter, is determining the degree of accuracy of each of these four characteristics.

INHERENT ACCURACY

The globe, by nature, is accurate on all four counts. Its careful construction being assumed, meridians (the north-south lines) and parallels (the east-west lines) are correctly spaced and in the proper relationship. This means that direction, distance, shape, and area are all correct. The scale of distance is the same everywhere on the globe in all directions, a quality impossible to attain on any flat map of a large area. Areas are correctly represented everywhere on the globe and hence are capable of direct comparison with other areas. The shapes of continents are likewise true because they can be plotted accurately on a spherical surface like that of the earth itself. Directions are true because the meridians and parallels are correctly placed and correctly related at all points. It is for

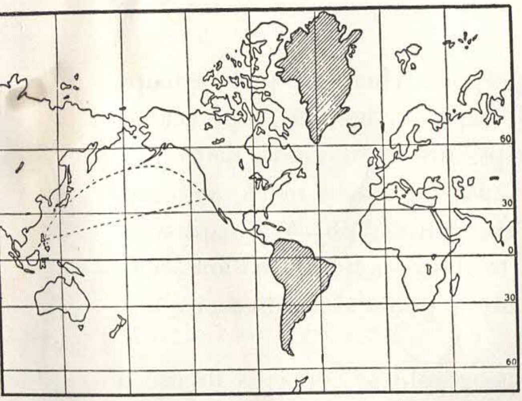

Fig. 7.2. Mercator's projection is essential for navigators. (Figs. 7.2 and 7.3 courtesy of Denoyer-Geppert Company.)

these reasons that the globe is known as the only correct map of the world.

INHERENT INACCURACIES

Flat maps always distort to some extent. This is true because it is impossible to flatten the surface of a sphere without breaking it into a number of parts and separating them from one another at all except a few points. As an illustration, carefully peel an orange up and down, not around, and try to flatten the peelings. You can do this only by splitting them, which leaves gaps between the several pieces.

Projections a Partial Solution

Map makers have attempted to solve the problem of flat map representation by means of projections. This term means, in this instance, a representation of the curved surface of the earth on a plane or flat surface. There are literally hundreds of projections, each of which has certain desirable properties for a specific purpose.

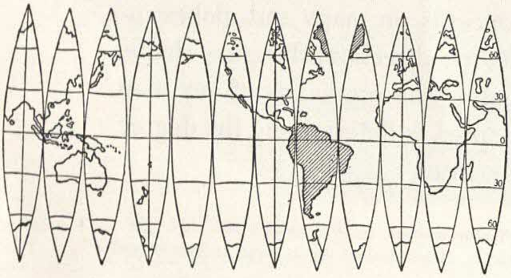

Fig. 7.3. When the surface is divided along the meridians, the resulting sections are called "gores." Note spaces between flattened gores.

One of these, Mercator's projection (Fig. 7.2), was and still is used in many classrooms in the United States. The Mercator is valuable for navigators because any straight line can be used as a compass line. The nature of this projection, however, causes extensive and increasing distortion of shapes, areas, and distances from the equator.

In making a Mercator map, the surface of the globe is first divided along the meridians. The surface is then "peeled off," producing segments or "gores" (Fig. 7.3). In order to make the map more understandable and more logical to the viewer, the blank spaces are filled in.

The fallacy of the Mercator projection is well brought out by a comparison of Greenland and South America in the Mercator projection shown in Fig. 7.4. Instead of being larger than South America, Greenland is actually much smaller, as is indicated by the three drawings. Another interesting comparison of this type is that between the continental areas of North America and Africa. In both cases, the map user is given an extremely distorted impression.

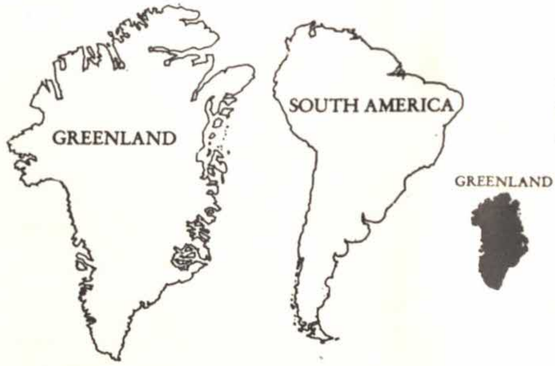

Fig. 7.4. The distortion of areas increases with distance from the equator on a Mercator projection. (From *Maps and How to Understand Them*, Consolidated Vultee Aircraft Corporation.)

ABSTRACT NATURE

Maps and globes are usually highly abstract. One reason for this is that they represent areas too large to be clearly seen or photographed as a whole. Accordingly symbols, lines, words, and colors are used to convey the information presented. A dot, for example, fixes the location of a city. A line of one type means a highway; another represents a political boundary such as a county or state; still others designate rivers, railroads, trade routes, elevation contours, natural boundaries between water and land, direction, and other similar features.

Usually the symbols on a map bear little visual resemblance to what they represent. Sometimes, as in the case of parallels, meridians, and contour lines, they represent things that cannot actually be seen anywhere on the earth's surface. Hence, in order to read maps and globes successfully, we must be able to interpret many symbols and colors.

Color helps to make a map readable, but the colors used are different from those in nature. Since it is obviously impossible to show the actual colors of land and water surfaces as they vary with season, vegetation, rainfall, location, and other factors, the cartographer must assign somewhat arbitrary meanings to the colors he uses.

GLOBES

As was said above, a spherical map on a globe is the only true map of the earth because the earth itself is a sphere. In actuality, the earth is not a perfect sphere, but the divergence is so slight as to make no practical difference. The diameter of the earth at the equator is 27 miles greater than its north-south diameter at the poles. This 27 miles is one-third of 1 percent of the earth's diameter. On a 10″ globe the difference amounts to less than half the thickness of a dime, a difference which no eye can detect.[2] Thus for any but the most highly technical purposes, the earth may be described as a true sphere.

The surfaces on most globes are printed as flat gores (see Fig. 7.3). When they are being mounted on the sphere, these gores are stretched slightly so that they will fit together properly on the spherical surface.[3] Thus, if one "peeled" a globe he would be unable to flatten out the sections any more successfully than he could in the case of the orange mentioned above. A film entitled *Impossible Map* illustrates this in an interesting and highly effective manner.[4]

TYPES OF GLOBES

Globes vary in both size and type according to function. The size is usually expressed in terms of length of diameter, the most common sizes being 8, 12, 16, 20, and 22 inches.[5] The 8″ globe is suitable only for individual study; the 12″ and 16″ globes are most frequently used for group or class purposes. Slated or project globes in the 20″ and 22″ sizes are also being used widely in schools.

Other factors being equal, it would be highly desirable for all globes to be large enough to be seen readily by an entire class. However, the prohibitive cost of handmade globes larger than 16″ and the great amount of space taken by a globe large enough for an entire class to see, are factors which have prevented the use of larger globes in most school systems. A noteworthy exception is found in some schools in which teachers and pupils have constructed large globes of their own.[6] An example of such a globe is shown in Fig. 7.5.

Three principal types of globes are valuable for school use: political globes, physical-political globes, and slated outline globes. A simplified political globe with a minimum of details is desirable for the primary

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[2] Irving Fisher and O. M. Miller, *World Maps and Globes*, Essential Books, New York, 1944, p. 5.

[3] Erwin Raisz, *General Cartography*, McGraw-Hill, New York, 1948, p. 267.

[4] *Impossible Map*, 16 mm., Sound, Color, 10 min., National Film Board of Canada.

[5] Edna E. Eisen, "Maps, Globes and Charts," *American School and University*, 1947, p. 188.

[6] John Sternig, "Home Made Visual Aids," *See and Hear*, April, 1946, pp. 23–28.

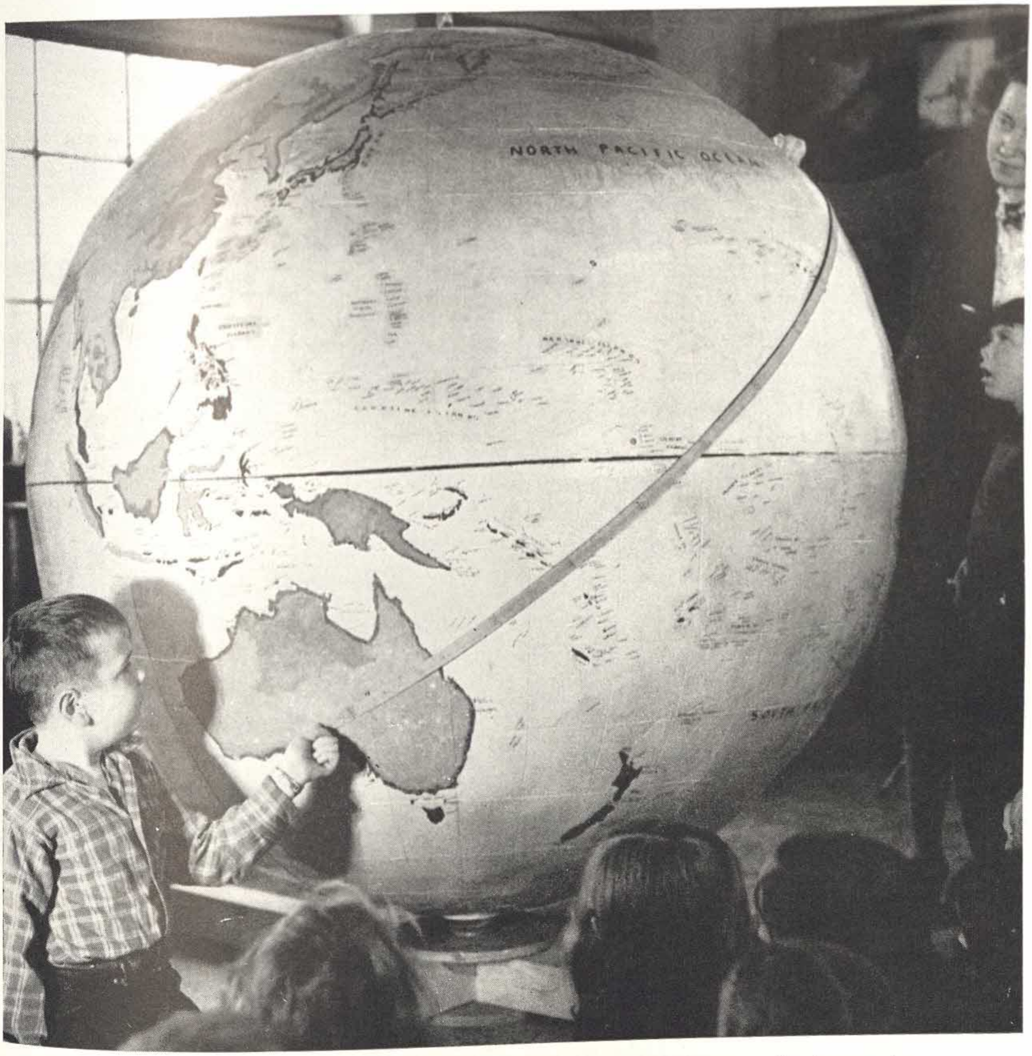

Fig. 7.5. A large globe made by pupils is an impressive teaching tool which can readily be seen by the entire class. (Courtesy of Glencoe, Illinois, Public Schools.)

grades.[7] If globe and wall maps have identical colors, this type of globe can be particularly helpful in the transition to flat maps in the intermediate grades.[8]

Physical-political globes should be introduced at the intermediate level

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[7] Thomas Barton, "Teaching Geography with Globes," *Education*, January, 1945, p. 313.

[8] Arthur Robinson, "An Analytical Approach to Map Projections," *Annals of the Association of American Geographers*, December, 1949, p. 285.

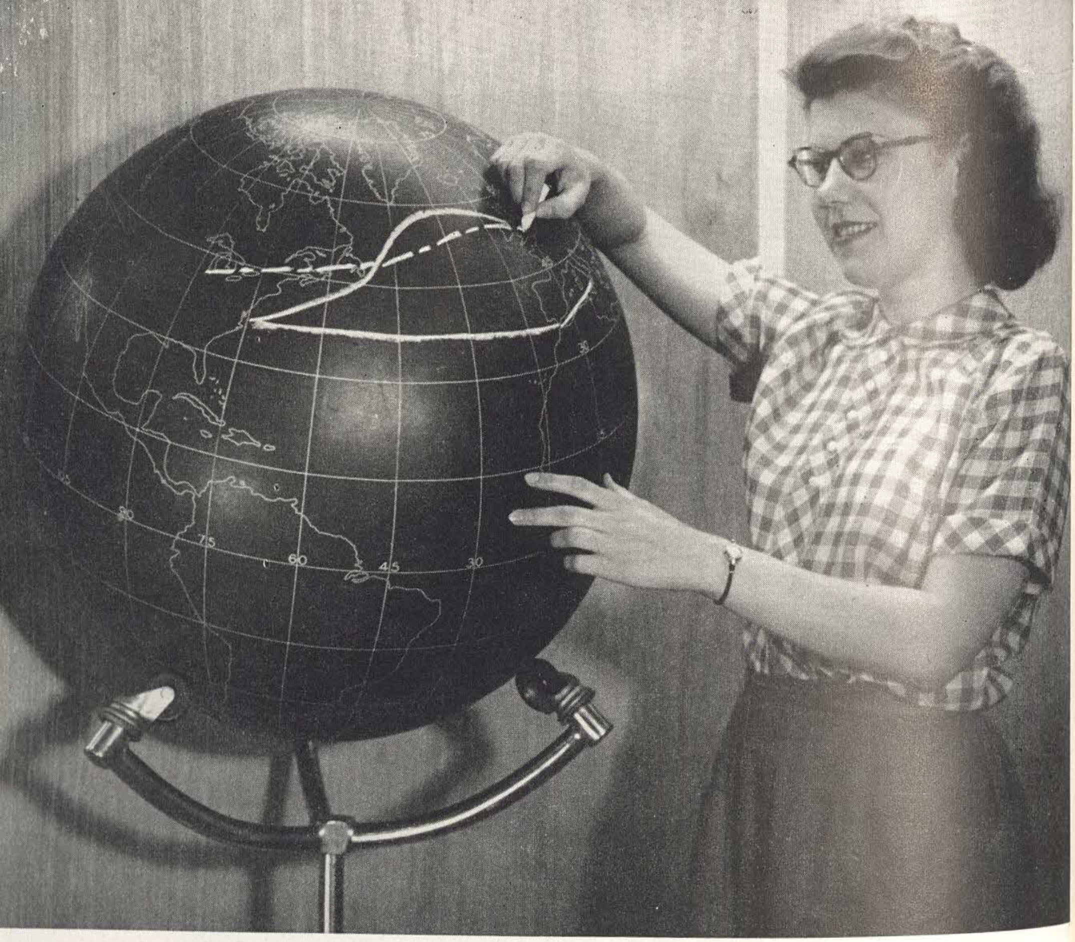

Fig. 7.6. Large slated globes permit good visibility and focus attention. (U.S. Navy.)

and used at all levels above the primary grades.[9] A color system is usually used to indicate elevations; political boundaries are indicated by colored lines. Some map companies are producing wall maps of the world and physical-political globes that have the same colors—a decided instructional advantage, particularly at the elementary level.

The slated outline globe (Fig. 7.6) is of great value at all grade levels. Instructors and students can write on it with chalk, indicating such features as locations; air, sea, and land routes; and great circles. Psychologically the unique advantage of this globe is that it permits attention to be focused on one thing at a time. In addition it is particularly well suited for direct pupil activity and experience. Globes of this type are available with continental outlines and grid as well as with plain surfaces. Since the construction of slated globes does not involve the painstaking application of printed gores to the surface of a sphere, these globes are relatively inexpensive in proportion to their size. The armed services used a 25″ slated globe for instruction in navigation during World War II.

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[9] Thomas Barton, *op. cit.*, p. 314.

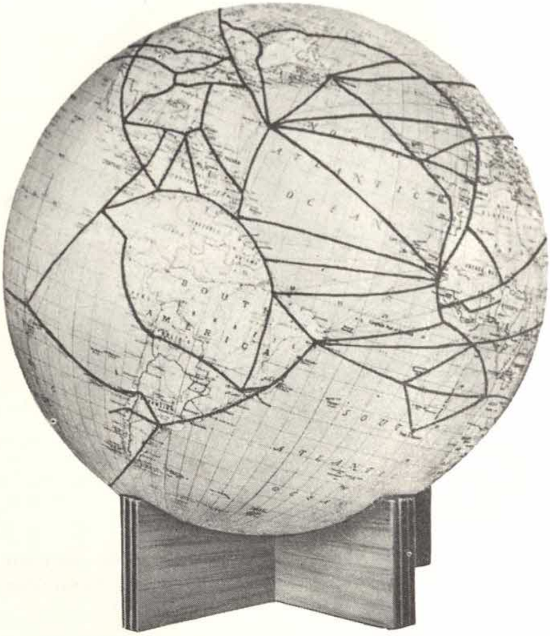

Fig. 7.7. Air routes and air distances are emphasized on the air-age globe. (Courtesy of Weber Costello Company.)

The air-age globe (Fig. 7.7) has come into prominence with the rapid development of air travel. Such a globe shows the names of important places in the world and emphasizes air routes between them. Such features as parallels and meridians, and oceans, continents, and nations are of secondary importance. This special-purpose globe is particularly useful at the junior- and senior-high-school levels in developing such concepts as the freedom of air travel from natural barriers and the consequent easy change of location among the peoples of the world. The advantage of using an air-age globe with an air-age wall map is obvious.

There are various other special globes such as celestial, physical relief, and climatology globes. Each has its own particular advantages for specific purposes. For general school instruction in basic geographical concepts, however, the simplified political, physical-political, and slated outline globes just described are recommended. These globes, in addition to appropriate wall maps, text maps, and atlases, give the teacher the materials required for effective, meaningful teaching.

GLOBE MOUNTINGS

Several types of globe mountings are commonly used, including the popular cradle mounting, the pedestal mounting, and the suspension mounting.

The cradle mounting (Fig. 7.7) has the important advantage of permitting easy removal of the globe for handling and examination from any angle. The globe fits the cradle well and can be revolved freely in any direction. The cradle mounting is particularly valuable in initial learning experiences with the globe.

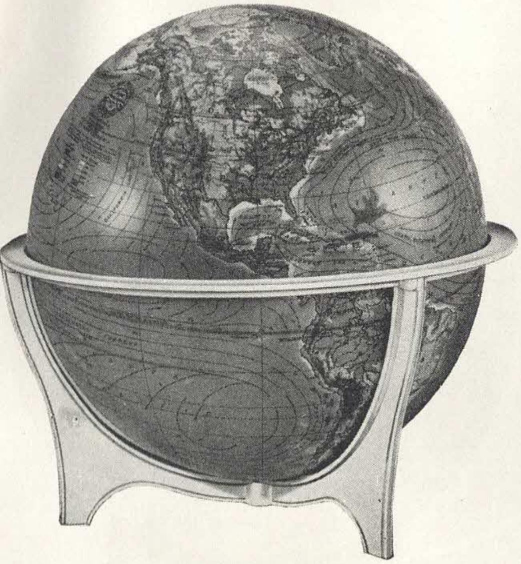

Fig. 7.8. The horizon ring divides the globe into hemispheres for easier comprehension. (Courtesy of A. J. Nystrom & Co.)

A tape or string may be used to measure great-circle distances. Some cradle mountings have a "horizon ring" (Fig. 7.8) containing distance readings; the globe is placed so that the points to be measured are on the ring. The horizon ring is also valuable for demonstrating global hemispheres. A disadvantage of it is the fact that it covers the equatorial regions when the globe is in its mounting.

Pedestal or floor-stand mountings (Fig. 7.10) often have an axis in the globe, and a split or full ring from pole to pole. The globe rotates on its axis and with the full meridian ring can be inclined to any degree. By changing the inclination of the globe, any hemisphere can be viewed from the horizontal. Pedestal mountings normally have a heavy disk base to minimize the danger of tipping. Some are equipped with casters so that the globe can be moved easily around the classroom.

The least expensive type of mounting is called the plain or plain stand mounting (Fig. 7.9). The globe rotates on its axis at a fixed inclination of 23½ degrees. An advantage of the plain mounting is that the globe is unobscured by any part of the mounting. Its principal disadvantage is the fixed inclination of the axis which makes it impossible to see any desired surface from the horizontal.

A pendant or hanging mounting for globes is convenient for classrooms where the floor space is limited. This type of mounting consists of a counterbalanced pulley and cord arrangement which permits the globe to be raised or lowered easily. The mounting usually includes a full

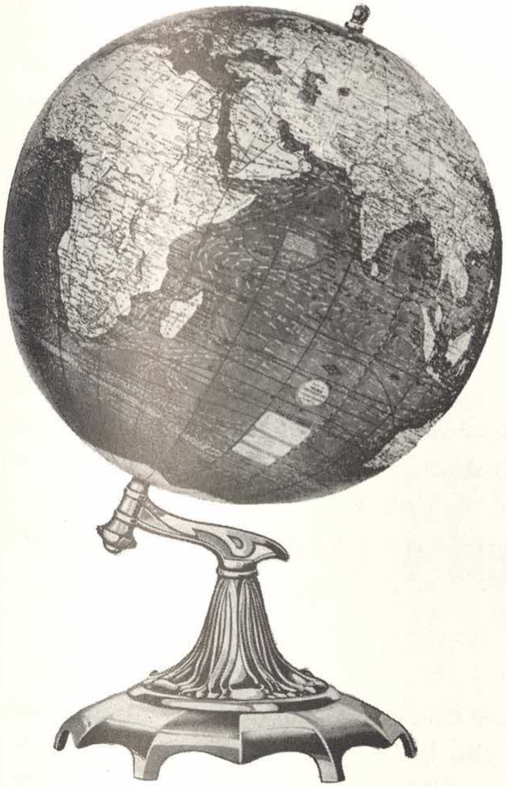

Fig. 7.9. (Courtesy of Weber Costello Company.)

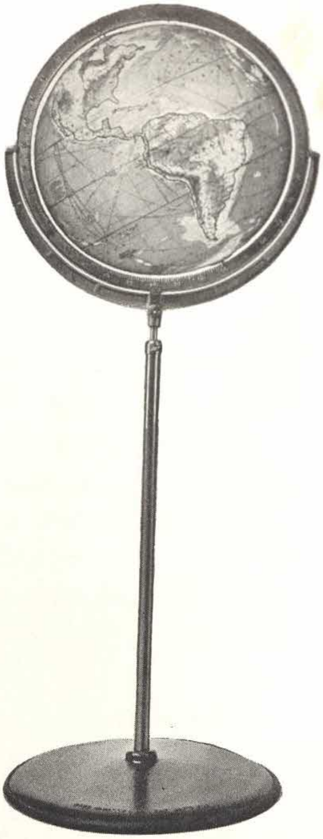

Fig. 7.10. (Courtesy of Rand McNally & Company.)

meridian ring. The globe rotates on its axis and can be inclined to any degree. An advantage sometimes mentioned is that the globe appears to be floating in space as it actually does. A disadvantage of this type of mounting is that the globe cannot be moved around the room.

MAPS

Wall maps are available in two principal types—physical maps, or maps which show terrain, and maps that show all other kinds of features. As was said above, there are numerous combinations and variations of these basic types, such as political maps, physical-political maps, regional maps, and special-purpose maps of many kinds. The latter present such information as the distribution of rainfall, population, world products, natural resources, thermal regions, land use, railroads, airlines, sea trade routes, and historical data.

POLITICAL MAPS

Political maps show phenomena which are principally man-made, such as national, state, and county boundaries; the location of cities, highways, and railroads; and national and state parks.

The common road map is a good example of a political map. Another example is a world map showing colonial possessions and the mother country in the same color.

PHYSICAL-POLITICAL MAPS

Frequently certain terrain and political features are shown on the same map; such a map is known as a physical-political map (Fig. 7.11). These maps are particularly useful in illustrating certain relationships between the terrain and man's settlement of the land. For example, the small number of large cities in mountainous regions is readily shown on a physical-political map.

PHYSICAL MAPS

Terrain and physical concepts are essential for an understanding of the climate, agricultural production, and life of a given area. Thus the influence of the Rocky Mountains on life and vegetation in the western plains states, which is normally taught in the intermediate and junior-high-school grades, and the elementary concepts of valleys, plains, deserts, rivers, rainfall, and temperature all involve to some degree an understanding of topography.

Good physical maps are invaluable for teaching topographical concepts. The typical physical-political map, however, is inadequate for visualizing the topographical characteristics of a region. Such maps actually show elevation rather than relief, because different colors are the principal means employed to show physical features. On such a map, for example, the rugged Adirondacks and the level plains of western Kansas are frequently shown in the same color.[10]

The best physical maps for teaching purposes are three-dimensional relief maps, like that shown in Fig. 7.12. Such maps have been prohibi-

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[10] George T. Renner, "The Educational Revision of Wall Maps," *Journal of Geography*, January, 1941, p. 18.

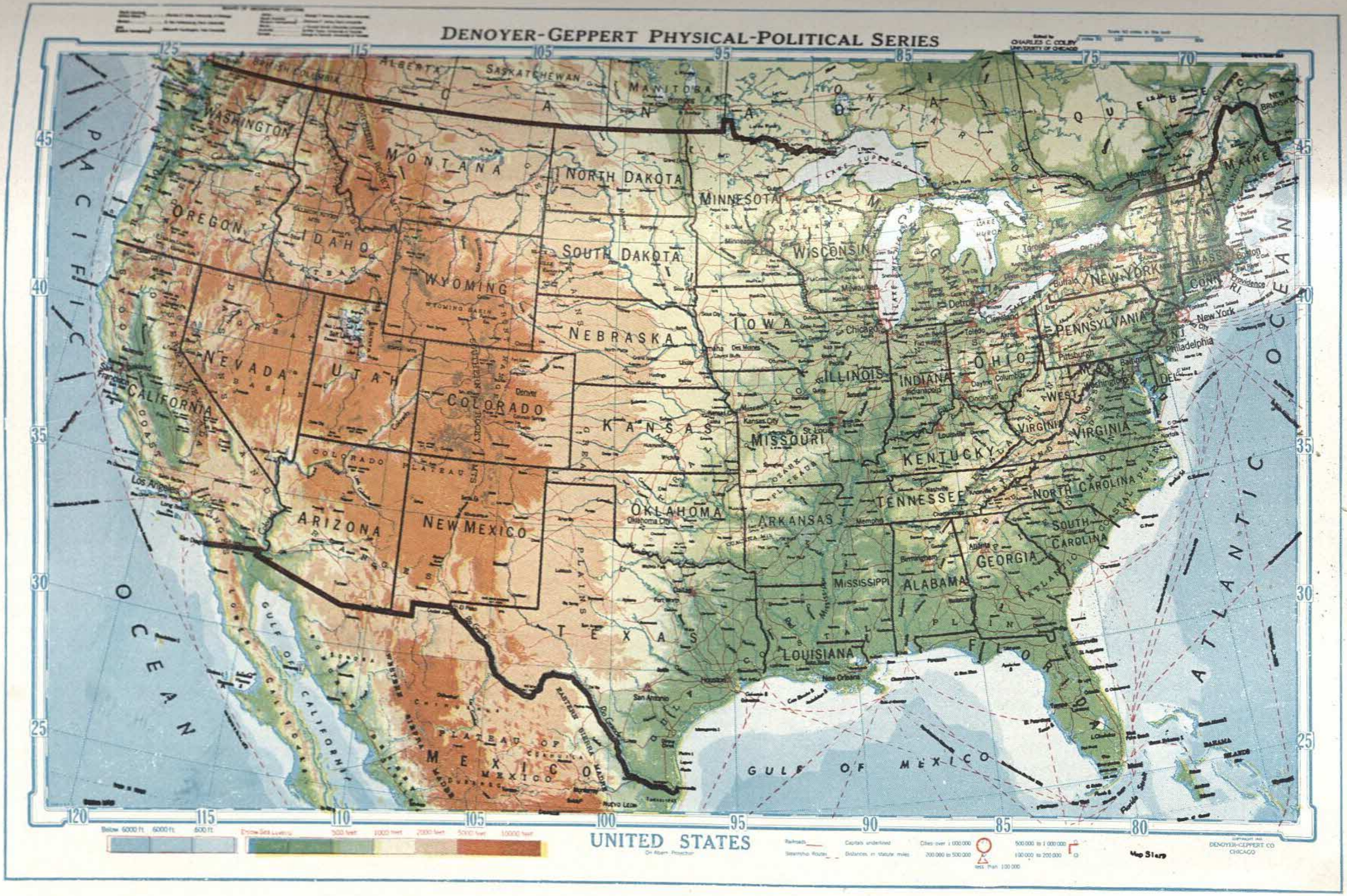

Fig. 7.11. (Courtesy of Denoyer-Geppert Company.)

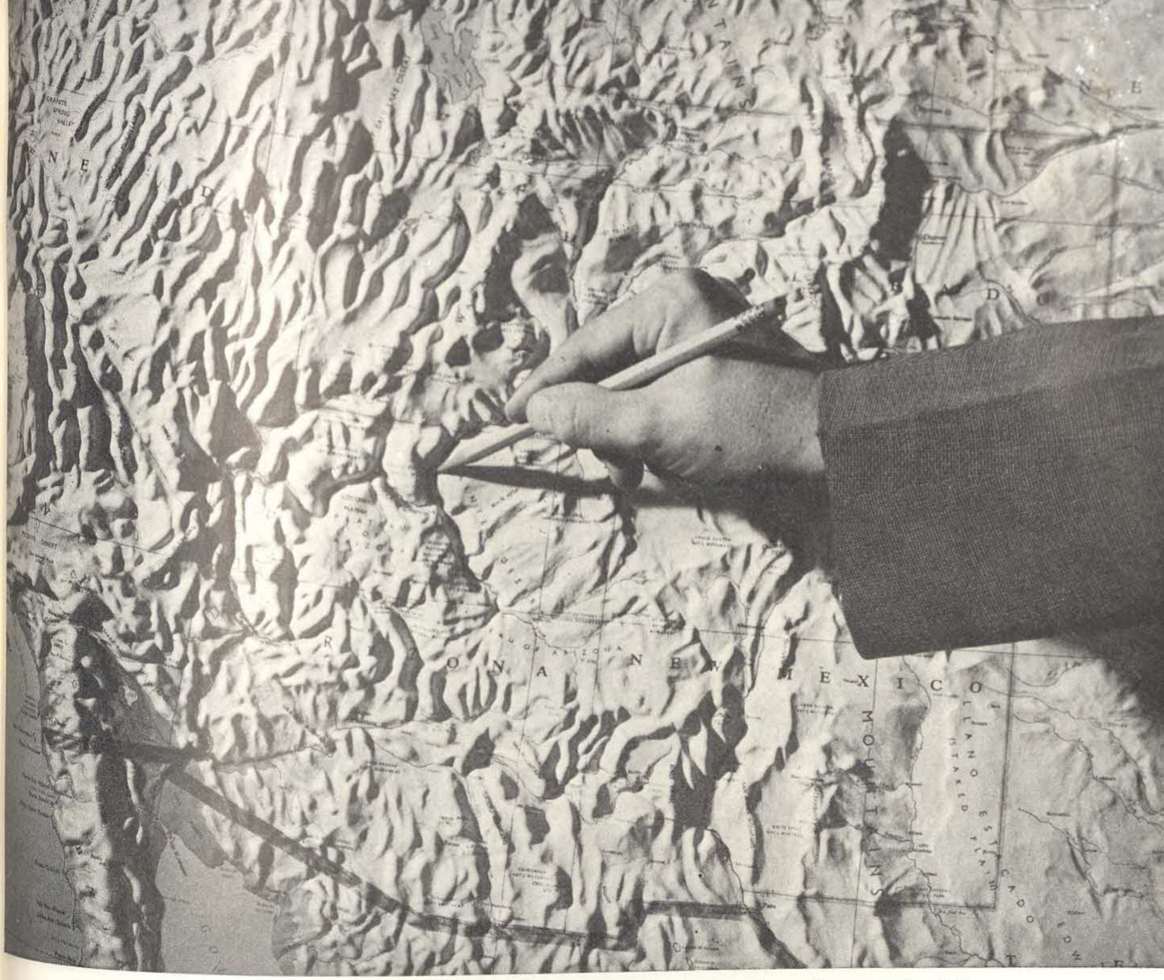

Fig. 7.12. One can visualize and comprehend mountains and valleys with a three-dimensional relief map. (Courtesy of Aero Service Corporation.)

tively expensive and cumbersome for general school use, but both handicaps are being overcome by the sturdy, light-weight, and relatively inexpensive plastic maps developed after World War II.

Three-dimensional relief maps of local areas can be made by teachers and pupils for any regions for which U.S. Geological Survey topographical maps are available. These maps are not difficult to construct and are of significant value in developing map-reading ability. One is shown in Fig. 7.13. One method of preparation is to enlarge a small section of a topographical map and trace the contour lines on corrugated cardboard. The contours are then cut out and mounted on top of one another in the correct relationship. The surface is covered with patching plaster and painted when dry.

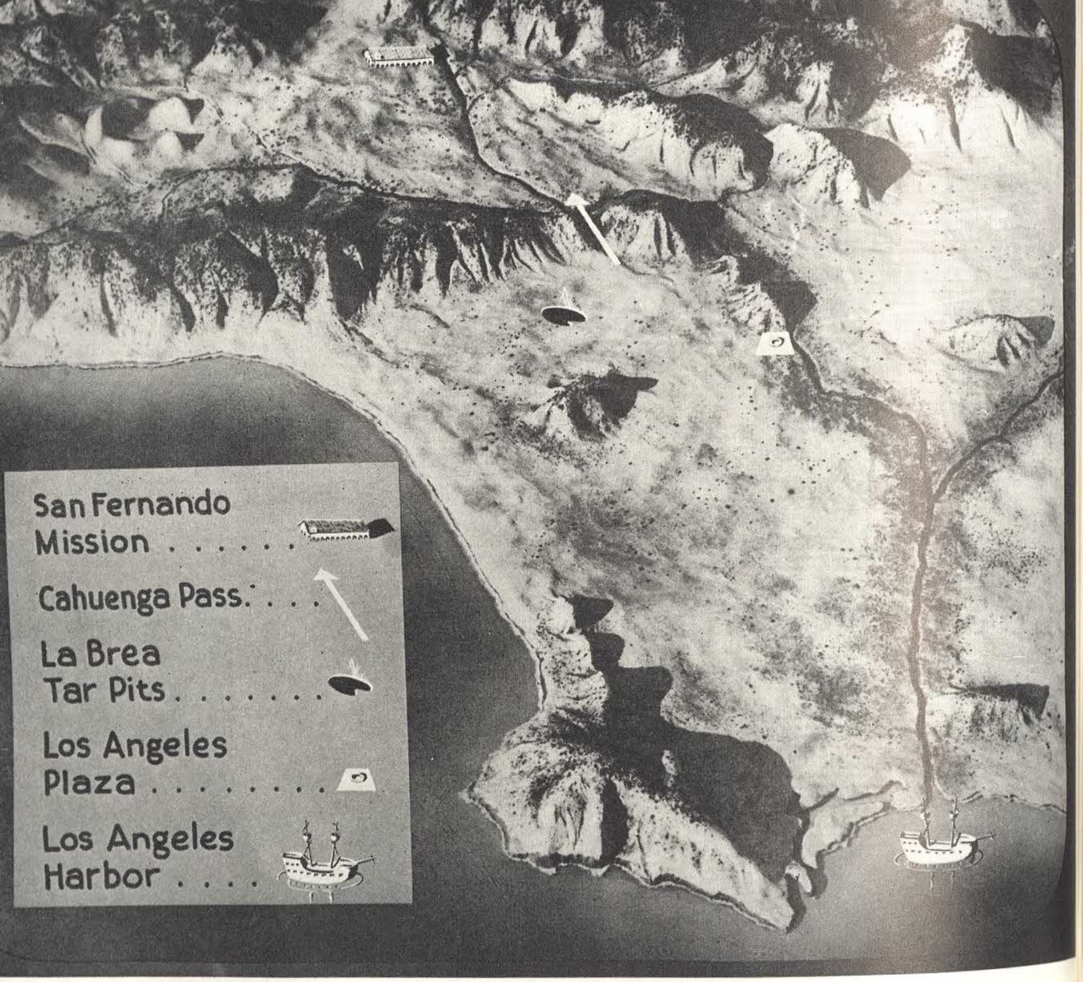
San Fernando Mission . . . . .
Cahuenga Pass. . . .
La Brea Tar Pits . . . . . .
Los Angeles Plaza . . . .
Los Angeles Harbor . . . .

Fig. 7.13. A good terrain map of a local area can be made by teacher and pupils. This map makes Los Angeles children see their harbor area vividly. (Courtesy of Los Angeles City Schools.)

Physical maps which show actual relief and amplify it with color and shading are probably the most effective type of physical wall map for school purposes. Although any relief map exaggerates the elevation in relation to horizontal distance, land surface concepts are made more concrete by relief than by the more abstract hachure and color symbols.

SUPPLEMENTARY MAP MATERIALS

The preceding discussion has covered the principal types of wall maps and globes and pertinent factors in their selection. Space does not permit similar discussion of individual outline maps, pictorial maps, text maps, atlases, and similar valuable instructional materials. There are, however,

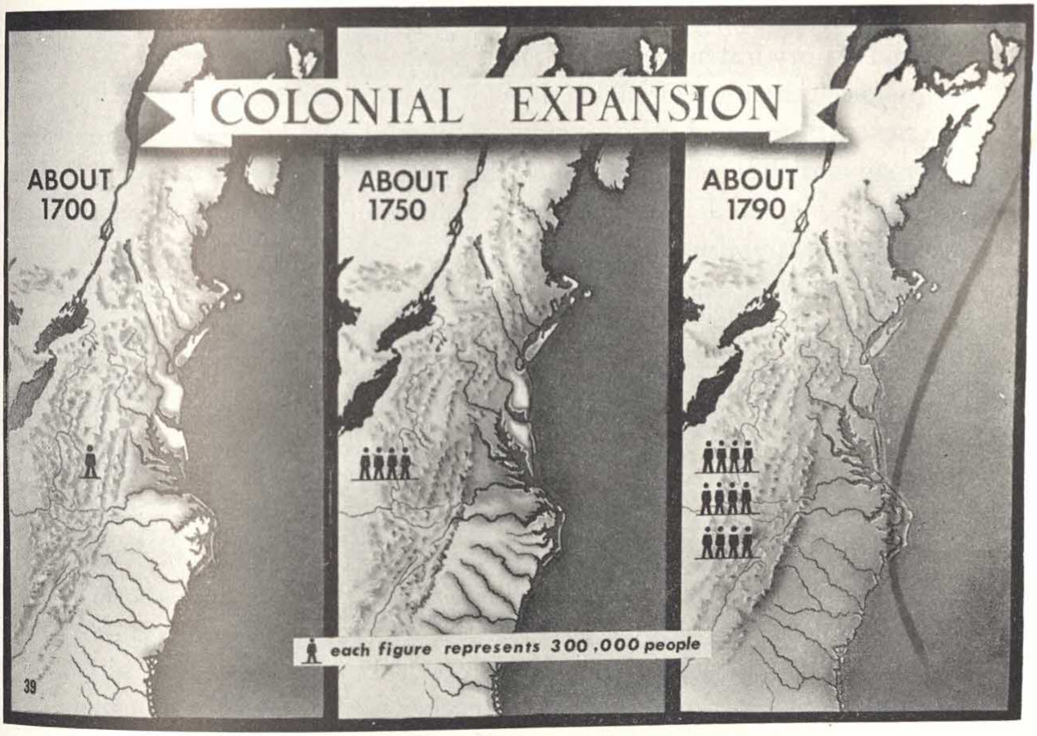

Fig. 7.14. Colored 2- by 2-inch historical map slides effectively focus attention on a topic. (Courtesy of Films Incorporated.)

several useful supplementary materials which demand mention because of their unique instructional values. These include projected maps, slated wall outline maps, and chalkboard stencil maps.

PROJECTED MAPS

Projected maps are commonly associated with travel lectures but are of even more significant value in schools. For example, the maps in an atlas can be projected effectively in an opaque projector, particularly if the machine has a 1000-watt lamp and can take illustrations as large as 8½″ x 11″. Photographic or hand-made map slides and large transparencies provide a brilliant image on the screen and are convenient to use.

Pictures of old maps taken from atlases and maps drawn by geographers and historians to present selected data such as those in the Pageant of America series have been used in schools and colleges for many years.[11]

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[11] Julian C. Aldrich, "Using Map-Chart Slides in Teaching Social Studies," Dept. of Audio-Visual Instruction, *1950 Conference Proceedings,* National Education Association, p. 21.

Handmade maps on 3¼″ x 4″ slides have a definite value in geography and history instruction also, both for those who make them and for those who see them. Color slides showing physical-political maps of the continents, states, and other regions of interest can be obtained from some map and slide producers. Such slides can be used effectively with traditional map and text materials; furthermore, they provide variety and stimulate pupil interest.

A series of 2″ x 2″ color slides of pictorial maps and charts in the social studies illustrates a unique application of slides to geography and history instruction. These slides are correlated with such units as discovery and expansion in the Americas (Fig. 7.14), early colonial history, the Revolutionary War, economic development, and the westward movement. They provide excellent simplified, vivid, and colorful supplementary maps to be used with text, pictures, wall maps, and globes.

An overhead projector (see Chapter 13) can also be used to project maps. Transparencies are available in full color or in black and white for a variety of maps. Their size, 10″ x 10″, permits excellent representation of detail and the projected size can be as large as the screen surface permits. While facing the class the teacher can use a pointer for emphasis; he can also draw on the map itself and the marks will be projected.

Outline maps can be traced on sheets of clear plastic and projected on the screen. The projected maps can be used as a basis for discussion and reports, the desired information being put in with a grease pencil. All such markings are easily removed with cleansing tissue.

Among the advantages of projected maps are: (1) the pronounced attention-focusing power of any projected image; (2) the relatively low cost which makes possible the use of more maps than might otherwise be feasible; (3) the stressing of a single concept by simplified maps; (4) the ease with which such maps can be related to globes and wall maps and to pictures of the region being studied; (5) the relative ease of storing and taking care of slides and transparencies.

SLATED WALL OUTLINE MAPS

Teachers know that pupils learn by doing, that directed pupil activity is necessary for "fixing" concepts in the pupils' minds. Teachers also know that complex ideas must be built up step by step, with each step simply and clearly defined. The slated wall outline map is very helpful in applying both of these teaching principles.

The instructor can show one thing at a time on a slated map without the class being distracted by extraneous details on the map (Fig. 7.15). Teachers know well how group interest is heightened when one member of the class goes to the map and chalks in a name, outlines an area, or traces an important parallel or trade route under the watchful eye of the rest of the class.

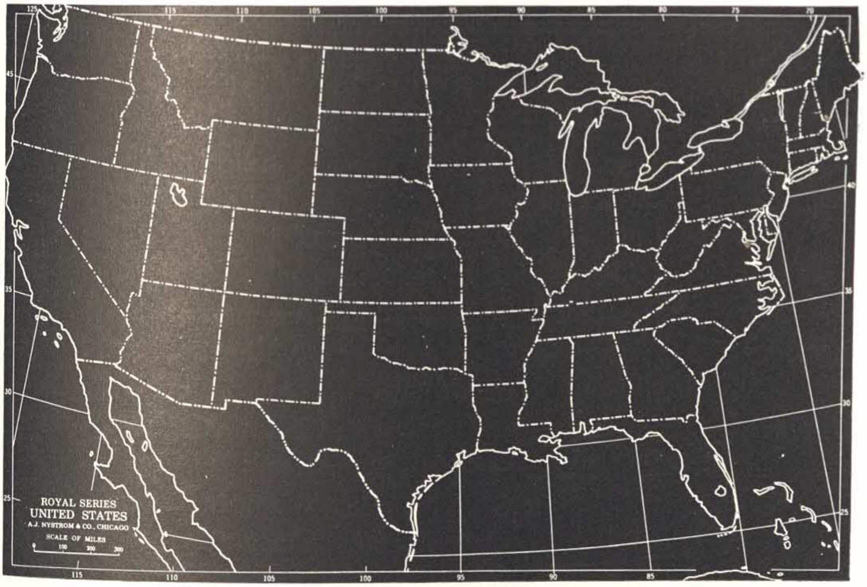

Fig. 7.15. (Courtesy of A. J. Nystrom & Co.)

CHALKBOARD STENCIL MAPS

An interesting and practical addition to a school's map materials is a chalkboard stencil map, a wall map that has perforations along state and national boundaries (see Fig. 3.5). A dusty chalkboard eraser rubbed over the surface of such a map transfers the map outline to the chalkboard.

Stencil maps are used in much the same way as are slated wall maps. The stencil map is particularly well suited when it is desired to have a number of pupils at the board at the same time, because as many maps can be stenciled on the chalkboard as the space permits. They are also convenient when the instructor wishes to present a quick illustration or two without disturbing work already on the slated map.

SELECTION OF GLOBES AND WALL MAPS

Having decided what type of globe and map materials he desires, the teacher will find certain other considerations helpful in making his final selection. Because the problems of presentation are quite different with a globe and a flat map, we shall consider them separately.

GENERAL CONSIDERATIONS IN SELECTING GLOBES

The factors of accuracy, visibility, simplicity, and color should be carefully considered in making a final selection of a globe.

Accuracy

As was said above, the globe is the only true map of the world and hence is inherently accurate as to area, shape, direction, and distance. This accuracy is actually obtained, however, only on handmade globes, the gores for which are carefully wetted and painstakingly stretched by hand so as to fit perfectly on the spherical surface.[12]

Mounting can be done by machine at considerably less cost but with reduced accuracy. When done in this way, the northern and southern hemispheres are printed separately and joined together to make a complete globe. The manufacturer of machine-made globes cannot guarantee the accuracy of matching the gores or hemispheres or the durability of the globe as compared to the accuracy and durability possible with hand mounting on steel balls.[13]

Visibility

A globe, at best, cannot be read in detail from more than a few feet away. Details are intended primarily for study by individuals and small groups at close range. Such broad features as hemispheres, land-water relationships, and the relative location of continents can be seen by the entire class, and even for such purposes the globe should be as large as possible. A further consideration is the fact that printed data can be presented considerably more clearly on a 16″ globe than on a 12″ globe because the surface of the first globe is nearly 78 percent larger. (The surface area of a 12-inch globe is 452.39 square inches; that of a 16″ globe is 804.25 square inches.)[14] A third important factor is that distance can be measured very easily on the 16″ globe because the scale is a convenient 500 miles to 1 inch, whereas the scale on the 12″ globe is 670 miles to 1 inch.

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[12] Erwin Raisz, *op. cit.*, p. 267.

[13] A. J. Nystrom & Co., *1950–51 Catalog of School Maps, Globes and Charts*, p. 5.

Simplicity

Closely related to legibility in a globe, as in a map, is simplicity. A globe is not an atlas; while much essential information can be presented on it, the inclusion of minute, rarely needed details is a handicap to its effective use. In recognition of this problem, manufacturers have made special simplified political globes and physical-political globes with simplified regional surface features for beginners. For more advanced work the traditional political and physical-political globes are periodically revised not only to keep them up to date but also to remove unnecessary details.

Color

The use of color on globes, as on maps, serves two important purposes. The first and more significant purpose is to aid legibility by distinguishing such features as land and water, lowlands and highlands, and political divisions. The second purpose is a matter of aesthetics; this is important, because pleasing colors contribute greatly to the favorable reception of a map, atlas, or globe.[15]

In general, the colors on physical-political globes follow the international color scheme used on the 1:1,000,000 physical map of the world.[16] Except for this, there is no standard color pattern for either maps or globes. On the whole, a good color contrast that gives optimum legibility and pleasing appearance is the major factor to be considered. Lighter shades are usually more satisfactory than deep primary colors. Colors should implement the teaching effectiveness of the globe rather than attract attention themselves.

The surface of all globes is treated with a transparent coating to protect it from undue wear. It is important that this coating should not reflect light to the extent of producing a glare and thus interfering with visibility. A semiglossy finish provides a smooth surface that can be cleaned easily and creates no undue glare.[17]

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[14] Weber Costello Company, *1950–51 Map and Globe Catalog MG-42,* p. 4.

[15] J. Paul Goode, *Goode's School Atlas,* revised by Edward B. Espenschade, Jr., Rand McNally, Chicago, 1950.

[16] *Ibid.*

GENERAL CONSIDERATIONS IN SELECTING WALL MAPS

Although, as was said above, a flat map is a flat representation of a spherical surface and hence has certain unavoidable inaccuracies, such maps are highly ingenious and valuable materials of instruction. The flat map, for example, provides the only convenient and efficient medium whereby a class of 30 or more pupils can see any considerable portion of the earth's surface at the same time. Moreover, without these maps the interpretation of various areas of the earth described in books, magazines, and newspapers would be severely handicapped.

The flat map is thus far more than a poor substitute for a globe. Each map has important functions and advantages, as well as limitations. The good teacher recognizes both the advantages and the drawbacks and accordingly bases his choice on instructional purposes. In many situations both a globe and one or more flat maps should be used. In any case the instructor will want to use the best maps available for his purpose and thus will find helpful some practical methods of evaluation and selection.

Function of Wall Maps

The wall map is designed to highlight major features. One writer refers to such maps as "pointer" devices and gives the following explanation: "This means that the wall map is not there to serve every purpose for which teachers and students may require a map, but to make it possible for teacher or students to point out to others in the room some essential features in the distributions which a given map shows."[18]

The wall map is not intended for a detailed study of small areas; that is the function of an atlas or a map in a textbook. Neither is it normally intended to present specialized information such as contour lines; air, sea, rail, and highway routes; radio channels; and compass corrections. While wall maps containing such specialized information may be very useful at times, their value is enhanced by reason of the fact that they usually emphasize only one type of information. Thus a railroad map shows rail lines and principal cities; a navigation chart shows water depths, shorelines, islands, reefs, currents, aids to navigation, and a compass rose; and a rainfall map shows rainfall areas and amounts for an indicated period. Extraneous details are omitted so that the map will be most effective when used for its specific purpose.

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[17] John Guy Fowlkes, "Evaluating Maps and Globes," *See and Hear*, October, 1945, pp. 64–66.

[18] Edna E. Eisen, *op. cit.*, p. 190.

Small inset maps are frequently printed on the margin of a wall map to provide such information as rainfall, vegetation, thermal regions, and population distribution. Although such information is unquestionably important, these inset maps can be seen by only a small portion of the class at best and in consequence are of little value. It should be kept in mind that the function of a wall map is to present major features which can be seen by all the class. A wall map can of course be studied in detail at close range, but the maps in atlases and textbooks are effective and much cheaper for this purpose.

Desirable Characteristics of Wall Maps

Most wall maps "look" good at first inspection; an attractive, artistic appearance is indeed highly desirable. Several factors are more important, however, including the suitability of the projection, simplicity and appropriateness to grade level, size and visibility, and color. Since map projections are complicated, we shall consider them separately later in the chapter.

SIMPLICITY AND APPROPRIATENESS TO GRADE LEVEL. No teacher would think of using an eighth-grade reading text with a second-grade class. Yet quite often the same maps are used at all grade levels, with little apparent regard for their complexity. The reason for this is partly the lack of good graded maps; but even more significant is the lack of a demand for such maps on the part of teachers and supervisors.

Wall maps are frequently crowded with too much information. As a result they are difficult to read clearly more than a few feet away, and are hard for the average pupil to interpret.

While it may be impractical to provide a different map for each significant geographical concept, there can and should be distinct levels of complexity in maps designed for elementary, secondary, and college use.

Since World War II, map publishers have produced maps that are simpler and easier to read than was formerly the case.

SIZE AND VISIBILITY. As has been said, wall maps are visualizations devised to present complete or partial global surface information on a single flat surface. Wall maps make it possible to sense at a single glance or viewing, key geographic, physical, or political concepts which on a globe would be always partially hidden to a single viewer.

In order to be useful in classroom study situations, wall maps must be so designed and of such size for students seated normally about the room to see and "read" the important relationships revealed by the map. Important symbols, shapes, names of gross land and water masses, and key terrain phenomena must be presented through such dramatic color areas and print size as to be visible, and thus understood by all viewers.

The printing on wall maps which relates to important concepts, names of continents and countries should appear in large type and of suitable spacing so as to make their reading possible anywhere in the seating area. "In so far as any data on a map cannot be grasped by the eye, and easily read, in just that measure is the map encumbered with useless material, and is a failure."[19]

Precise studies by Luckiesh and Moss[20] have determined the relative visibility of printed type of varying sizes. The relative visibility of that used on wall maps and charts is one important basis for map selection. Other factors than type size—among them background contrast, variations in type design, and crowded elements—influence legibility.

A study by Robinson[21] shows that 2″ letters at 30 feet appear the same as letters 1/9″ high at a normal reading distance of 18 inches. Letters 1/2″ in height require above average vision to be read at 20 feet, etc.[22]

Ordinarily, world maps need to be larger than maps of continents or smaller areas. Because of the area covered by world maps, key relationships, to be visible, must be presented by maps at least 4 to 5 feet wide.

COLOR. Appropriate color on maps is related closely to clarity and general effectiveness. Garish reds, blues, greens, purples, and oranges serve no useful purpose and in addition are unpleasant to look at. Heavy colors tend, furthermore, to make the lines and printed data more difficult to read. For both legibility and attractiveness pastel colors are desirable.

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[19] J. Paul Goode, *op. cit.*

[20] M. Luckiesh and F. K. Moss, "The Quantitative Relationship Between Visibility and Type Size," *Journal of the Franklin Institute*, vol. 227, pp. 87–97.

[21] Arthur Robinson, "The Size of Lettering for Maps and Charts," *Surveying and Mapping*, January–March, 1950, pp. 37–44.

[22] *Ibid.*, p. 40.

Map color is important. Elevation on physical-political maps is normally shown by means of color. Blue represents water, green represents lowlands, and various shades of yellow, orange, and brown represent increasing elevations. An international color scheme is followed by most map makers in producing physical maps. There is no standard color pattern for political or special-purpose maps, a fact that tends to create some confusion among younger pupils. It is desirable on world maps to have possessions in the same color as the mother country. Identical color patterns for world maps and globes are also helpful and effective, particularly for elementary use.

EVALUATING AND SELECTING MAP PROJECTIONS

The term "map projection" refers to the method used to represent the curved surface of the earth on a flat surface such as a wall map. As was said earlier, errors are unavoidable in any flat map. These errors affect two or more of the principal elements of any map—area, distance, direction, shape. Only the globe can present all four elements correctly.

Through the ingenuity of cartographers, many projections have been devised to meet specific needs for good flat maps; the Mercator projection was discussed earlier in this chapter. Unfortunately the literature on map projections is usually so technical that only skilled geographers and mathematicians can understand it. As a result, most of us have difficulty in knowing whether a projection is good or poor for our purposes, which means that maps are too often chosen without regard for the accuracy with which they present information. Nevertheless, there are some simple yet helpful factors which an interested teacher can consider in selecting more accurate and useful maps for classroom use.

THE GRID COMPARISONS METHOD

The problem of evaluating map projections for general classroom use is neither complicated nor difficult when approached by the grid comparisons method developed by Robinson at the University of Wisconsin.

pole, however, the meridians do not converge on this point but retain their normal position from pole to pole. Accordingly, as in the case of azimuthal projections, we must rely on the title of the projection itself. In this case the map title usually contains the word "equidistant."

It is important to remember that, normally, either distance or direction can be accurately measured from only *one* point on any flat map. This being the case, these two properties must be regarded as of secondary importance in selecting wall maps for general use. The important property is correct area; hence most continent and world maps used in geographical instruction should have an equal-area projection.[25] The validity of the representation of area on wall maps can be readily and quickly determined by the grid comparisons method.

SHAPE. The accuracy of shape is not readily determined by the application of grid characteristics alone. On small area projections, angular representations, as well as shape, are shown correctly if the parallels and meridians cross at right angles and the scale at any point is the same in all directions. Good shape in maps of large areas is provided by a reasonable balance of Points 1, 2, 4, 8, and 10 above, such as is found in minimum error projections. Contrary to popular belief, conformality (provided by Points 8 and 10) does not produce true shape.[26] By and large, for general use, shape is unimportant so long as the distortion is not extreme. The instructor can judge shape sufficiently reliably by visually comparing flat map shapes with those on a globe.

MINIMUM ERROR PROJECTIONS

The values of a little-known type of projection called minimum error projections have been described by Robinson.[27] These projections are a compromise in which areas, shapes, direction, and distance properties are balanced so as to present as realistic a map of a segment of the earth's surface as is possible. Although no property is completely accurate on a minimum error projection, the inaccuracies are moderate and inconspicuous to even a skilled observer. For other than technical or scientific purposes, therefore, these projections are quite satisfactory.

Several other projections which have specific properties come close to fitting into the minimum error group. Among these are the Lambert Conformal, the Albers Equal Area, and the Lambert Equal Area. The latter two give accurate area relationships, and the shapes on the Lambert Conformal are of above average validity. In addition, on all three projections there is a good balance of the remaining properties; the Lambert Equal Area, for example, presents correct area and true direction (it is the only projection that combines these two properties), good shape, and fairly good distance.

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[25] J. Paul Goode, *op. cit.*

[26] Arthur Robinson, "An Analytical Approach to Map Projections," p. 287.

[27] *Ibid.*, p. 287.

EFFECTIVE USE OF GLOBES AND MAPS

"I know of very few studies that do not have certain tools that must be mastered before the student can proceed," says one geographer. "Even literature depends upon the alphabet and grammar."[28]

"An intelligent citizen must use maps," says another. "From maps in newspapers and magazines, he obtains information on world and local affairs. Students in school also use maps as a source of information. If student and adult alike are to receive the full value from maps, they must be able to read them easily and accurately."[29]

"If correct concepts of world relationship are to be gained, one must have a globe. The globe is the best representation of the world that we have. . . . Every school room, even in the primary grades, should have a globe."[30]

There is grave need for teachers at all levels to consider seriously how to use maps and globes better in instruction so that students will learn (1) how to read them, and (2) how to get information from these essential tools of geography.

MAP-READING READINESS

Globes and maps are highly abstract. They represent the earth or sections of it by means of lines, colors, and symbols which bear little resemblance to the actual appearance of the earth's surface as a child sees it. They are a language all their own and, like any language, they must be learned. No one is born with the ability to read globes and maps. He must

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[28] Roderick Peattie, *The Teaching of Geography,* Appleton-Century-Crofts, New York, 1950, p. 28.

[29] Kathryn T. Whittemore, "The Place of Maps in Social Education," *Journal of Geography,* March, 1948, p. 110.

[30] Zoe A. Thralls, "The Use of the Globe," *Social Education,* April, 1947, p. 165.

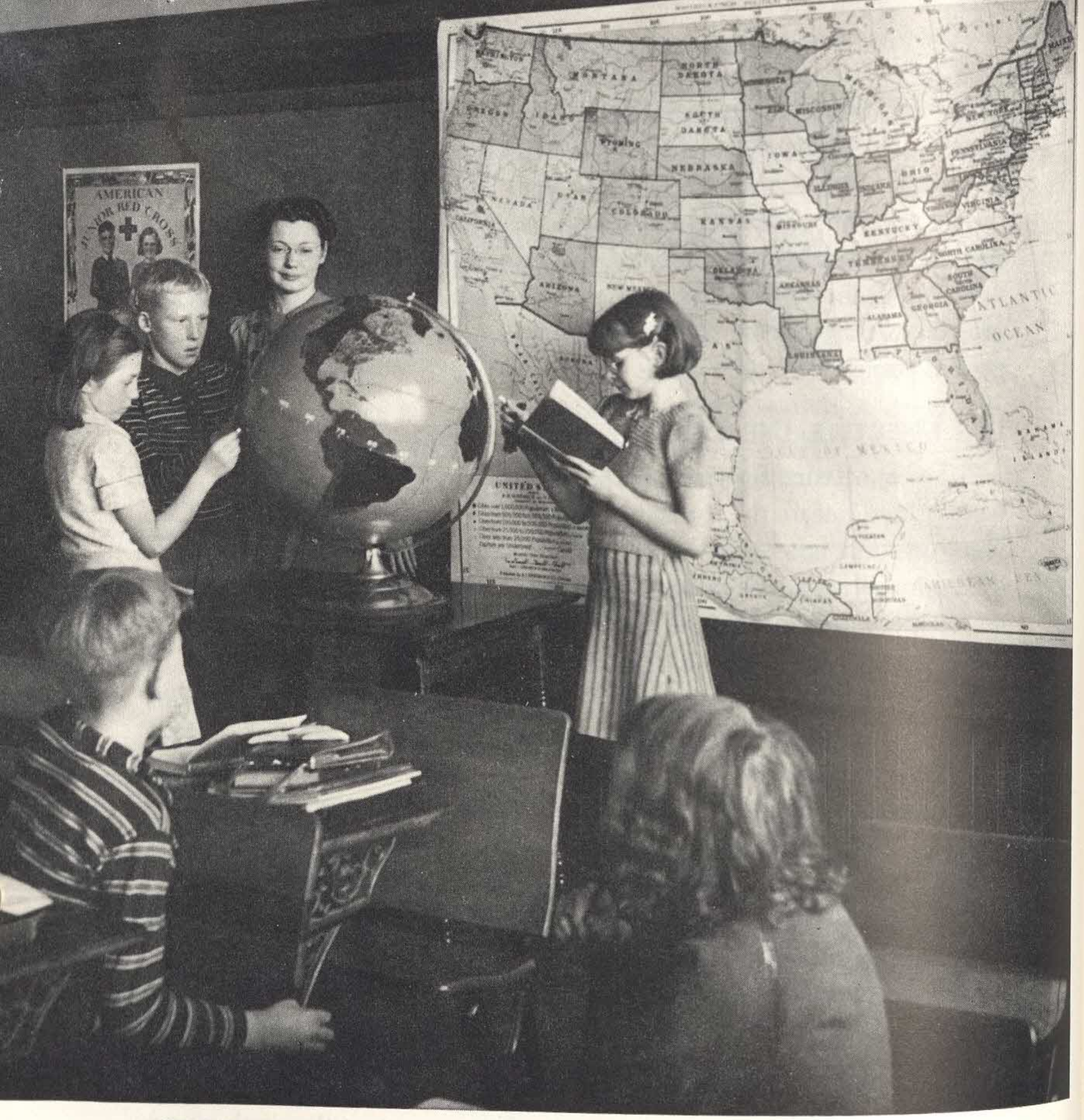

Fig. 7.18. Globes and maps should be as readily accessible to the pupils as are books. (Courtesy of Vancouver, Washington, Public Schools.)

be taught this just as he must be taught how to read words, sentences, and paragraphs.

Start with the pupil where he is. Instructors are familiar with this principle. It is inherent in good teaching at all levels. It is also another way of expressing another principle—that before symbols of any kind are taught, the pupils must have a background of experience which can give these symbols concrete meaning.

Where *is* the child so far as globes and maps are concerned? What is he familiar with that the teacher can use as a basis for beginning to teach him globes and maps? His home and yard, his immediate neighborhood, the way to school, his schoolroom, the school yard, and perhaps other parts of the community where his class has gone on a field trip.

"Children begin early and without direction to represent places they have seen by representing them with blocks or other materials. After a Buffalo kindergarten class had visited the Peace Bridge, the children built a model of the bridge across the classroom. They were able to tell which end of their bridge represented the Canada end and which represented the end near their school. They pointed out where the river flowed beneath the bridge."[31]

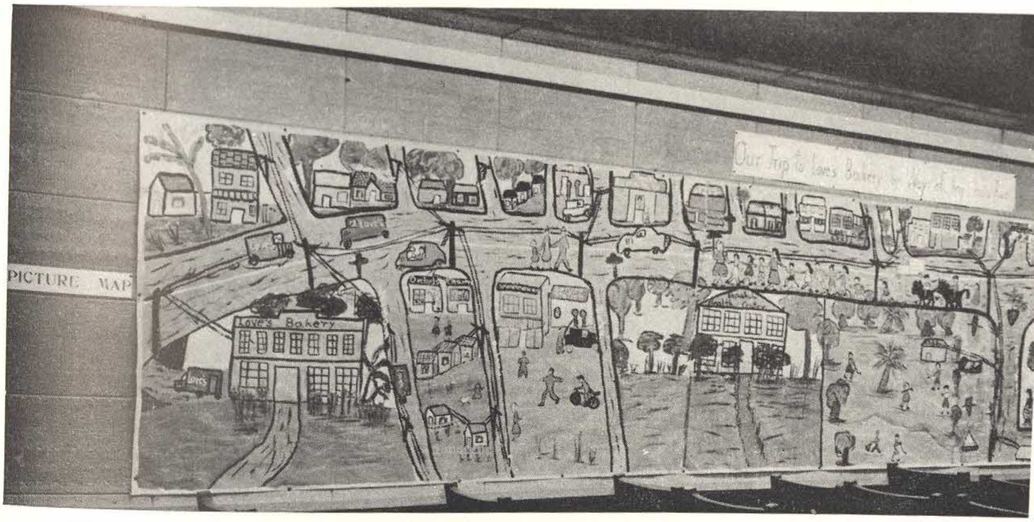

Fig. 7.19. Part of a picture map painted by Honolulu second-graders after a trip to a neighboring bakery. (Courtesy of Honolulu Public Schools.)

By the time they are in the third or fourth grade, children are ready to participate in making pictorial maps of familiar sections. The route to the local bakery followed by the class will likely be shown as an approximation of a ground plan; and such objects as buildings, trees, bridges, and the school bus are likely to be drawn realistically (Fig. 7.19). Perspective and scale may be crude or entirely absent, but nevertheless such

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[31] Kathryn T. Whittemore, "Maps," *Nineteenth Yearbook of the National Council for the Social Studies*, 1948, p. 120.

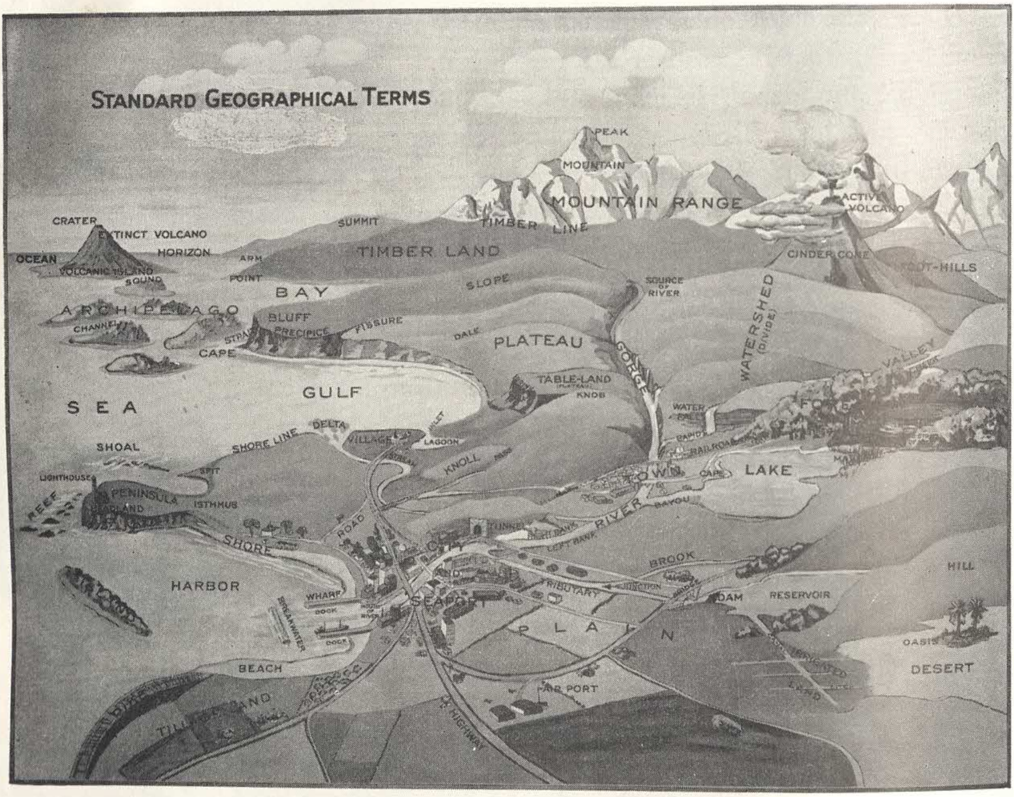

Fig. 7.20. To understand a map, one must learn the meaning of terms used on it. (Courtesy of Denoyer-Geppert Company.)

maps show the beginning of a feeling for relative size, location, and distance.[32] Providing experiences which naturally give rise to pictorial murals and maps is a good way to begin formal map work. Before long, symbols can be introduced to represent streets, buildings, important landmarks, and topographical features. These new meanings will be revealed through careful study of standard geographical terms such as are pictured in Fig. 7.20.

Use pictures. Pictures play a vital part in map-reading readiness. They are an interesting supplement to field trips, besides opening large areas of the earth to observation which would otherwise be impossible. Early concepts of land surfaces and climate can be developed through pictures.

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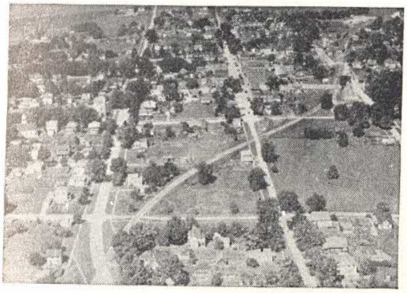
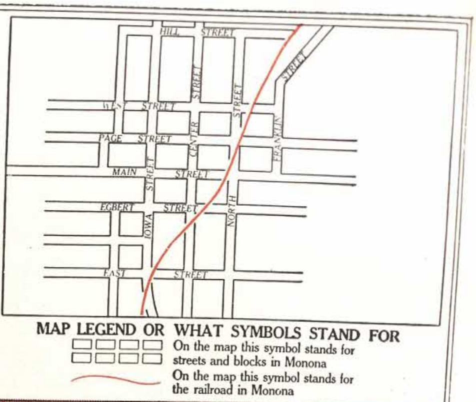
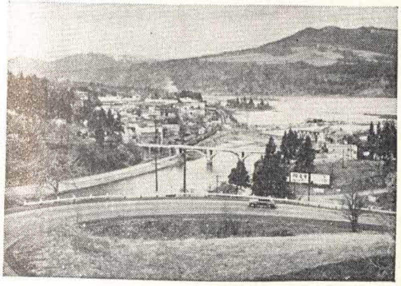
[32] *Ibid.*

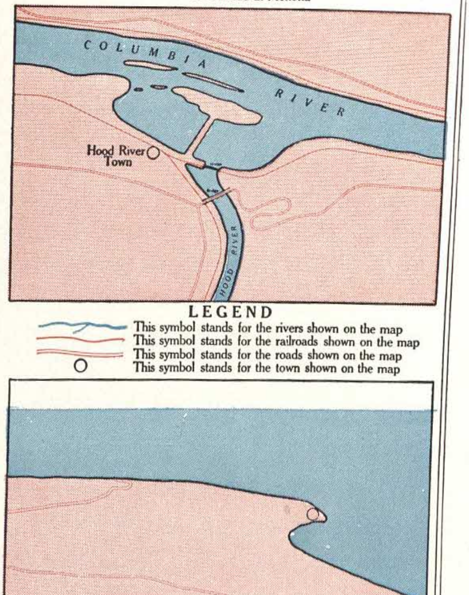


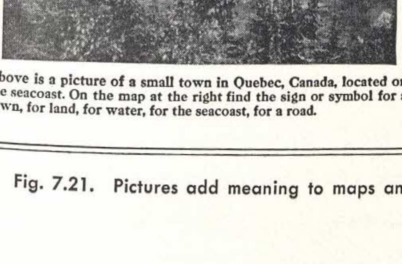
This is a picture of Monona, a small town in Iowa. The picture was taken from an airplane to show the streets and railroad. On the map at the right find the sign or symbol for the streets and the symbol for the railroad.


HILL STREET
WEST STREET
PAGE STREET
MAIN STREET
EGBERT STREET
EAST STREET
IOWA STREET
CENTER STREET
STREET
NORTH STREET
FRANKLIN STREET
MAP LEGEND OR WHAT SYMBOLS STAND FOR
On the map this symbol stands for streets and blocks in Monona
On the map this symbol stands for the railroad in Monona



Here is a picture of Hood River, a town in Oregon, located on the Hood and Columbia rivers. On the map at the right find the sign or symbol for a town, a symbol for a river, a symbol for a road, and a symbol for a railroad.


COLUMBIA RIVER
Hood River Town
HOOD RIVER
LEGEND
This symbol stands for the rivers shown on the map
This symbol stands for the railroads shown on the map
This symbol stands for the roads shown on the map
This symbol stands for the town shown on the map



Above is a picture of a small town in Quebec, Canada, located on the seacoast. On the map at the right find the sign or symbol for a town, for land, for water, for the seacoast, for a road.

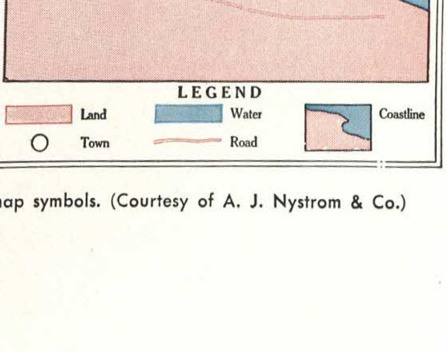


Fig. 7.21. Pictures add meaning to maps and map symbols. (Courtesy of A. J. Nystrom & Co.)

Charts are available which combine pictures with large-scale maps of small areas to illustrate the meaning of various map symbols; see Fig. 7.21.

Use a globe. The globe is an essential part of any map-reading readiness program. Not only are all flat maps derived originally from the globe, but it is by all odds the best medium for developing a true idea of the earth's sphericity. Every schoolroom, even in the primary grades, should be equipped with a globe.[33] For primary rooms the globe should be a simple one, perhaps showing nothing more than land and water areas, the poles, and the equator.[34] It should have a cradle mounting and be easily accessible for the pupils to handle. Although no formal teaching should be done, the children will become familiar with land and water masses and gain some ideas about location as their questions are answered.[35] They may even gain some understanding of the earth's rotation and the cause of day and night.

GLOBES AND MAPS IN THE INTERMEDIATE GRADES

In the fourth grade students are taught to *use* the globe. They should learn such things as (1) the actual and relative location of the areas being studied; (2) direction; (3) rotation and the cause of day and night; and (4) the equator and climatic zones. They should also formulate some inferences as to length of day, climate, and human activities in any given place.[36]

Introduce physical-political globes and maps. As North and South America and the other lands of the earth are studied in the fifth and sixth grades, the globe should be used regularly to establish and maintain correct concepts of relative location, size, and climatic influences. Physical-political maps and globes are used at this level and cross reference between them should become habitual.

Clarify scale concepts. As more maps are used, the scale assumes significance and its meaning must be carefully taught to avoid extensive

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[33] Zoe A. Thralls, *op. cit.*, p. 165.

[34] Gertrude Whipple and Preston E. James, "Instructing Pupils in Map Reading," *Social Education*, May, 1947, p. 206.

[35] Ralph C. Preston, *Teaching Social Studies in the Elementary School*, Rinehart, New York, 1950, pp. 246–247.

[36] Zoe A. Thralls, *op. cit.*, p. 165.

Fig. 7.22. Curiosity plus a good globe sets the stage for learning. (This and Fig. 7.23 courtesy of Madison, Wisconsin, Public Schools.)

misconceptions.[37] The ability to determine locations in terms of latitude or distance from the equator, when combined with the ability to read

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[37] Mamie L. Anderzohn, "What Is in the Mile Behind an Inch on a Map or Globe?" *Journal of Geography,* October, 1945, pp. 288–295.

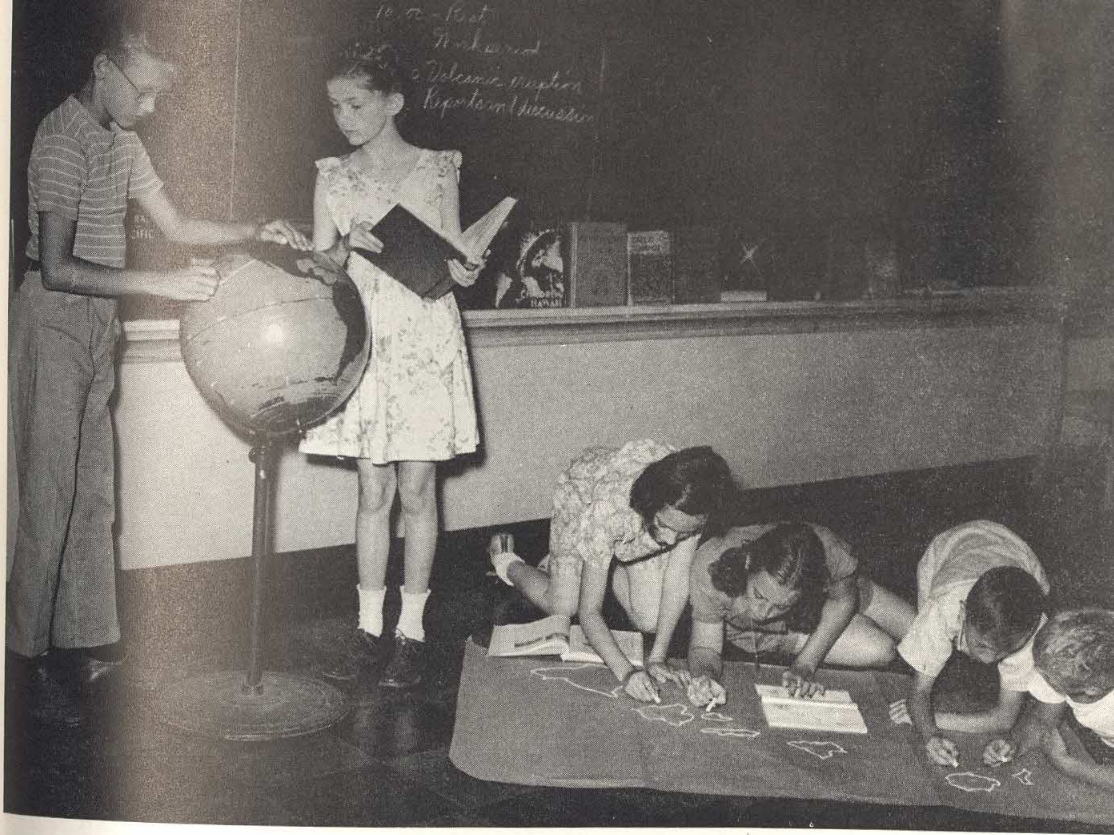

Fig. 7.23. Learning by doing.

scales, enables the pupil to compare and contrast different countries.[38] He may discover such fundamental facts, for example, as that Japan has approximately the same area as California and over ten times as many people. Such discoveries stimulate questions and set the stage for meaningful learning.

Have the pupils make maps. One valuable application of "learning by doing" is to have the pupils make maps of their own (Fig. 7.23). This is excellent for developing both map-reading ability and the power to interpret the data on maps. It is also a sound application of the principle of starting the learner where he is.

It is important to distinguish between mere copy exercises and creative map construction. While there may be certain values in transferring the

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[38] Hazel C. Davis, "What Can Elementary Pupils Learn from Maps?" *Social Education*, November, 1948, p. 317.

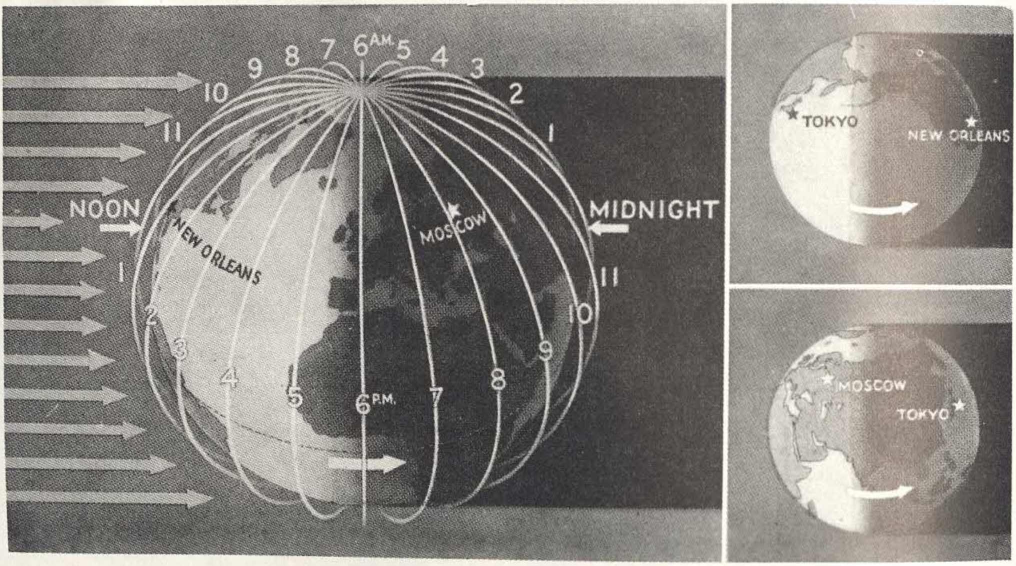

Fig. 7.24. The time-cage aids in understanding time zones and the reason for them. (From a color plate in *Compton's Pictured Encyclopedia*.)

thirteen colonies from a textbook map to a desk outline map, this should not be confused with actual map construction or the learning values accruing therefrom.

Relief maps of a local area provide an excellent basis for understanding surface features of the area and the physical and elevation symbols used on physical maps. These three-dimensional maps can easily be made by the teacher and pupils. U.S. Geological Survey topographical maps are available for most local areas and should be used, along with first-hand observation, for accurate construction. There are several methods of construction which give satisfactory results.[39] The great value of this type of map is that it is considerably more realistic than any flat map and accordingly can be very valuable in giving meaning to the physical symbols on flat maps.

GLOBES AND MAPS IN THE SECONDARY SCHOOL

A wide variety of maps and globes is essential at the secondary level where world concepts are developed on a broad scale. By this time the student should have learned to interpret maps as well as to "read" them, but this ability cannot be taken for granted. All too frequently he will have missed something along the line, perhaps because the teacher himself was not well enough trained. In any case, map reading, like English and spelling, is the responsibility of teachers at all levels. If the secondary-school pupil lacks basic map-reading skills, he must be taught them before he can proceed successfully.

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[39] See Ralph C. Preston, *op. cit.*, pp. 237–243, for details of one simple method of constructing a plastic relief map.

In the junior high school new concepts must be learned such as the earth's revolution, time zones (Fig. 7.24), the international date line, and great-circle routes. Globes are invaluable for teaching such concepts and slated globes are particularly helpful for related pupil exercises. At the junior and senior high-school levels numerous special-purpose maps containing economic, historical, and literary data are used regularly.

As with all other forms of audio-visual materials, the instructor selects and uses the globes and maps that achieve his purposes better than any other materials that are available to him. He uses them in combination with such other materials as textbooks, reference books, atlases, flat pictures, slides, films, filmstrips, field trips, bulletin board displays, and desk outline maps—according to what is needed. These materials are means rather than ends in themselves—means to gaining a clear and vivid understanding of the geographical, social, and cultural concepts that give meaning to the world in which we live.

SUMMARY

Globes and maps are a vital part of the school's instructional materials because they are the only means by which large areas of the earth, or the earth itself, can be effectively represented. Although globes are the only true maps of the earth, flat projections are necessary for detailed study, for ease of viewing, and for seeing the whole earth at one time.

No flat map, however, can avoid distortion in two or more of the following properties: area, shape, direction, and distance. It is important, therefore, to be able to determine readily what characteristics a given flat map does or does not possess. This can be done with relative ease by comparing the map grid with the globe grid. For most school purposes, equal area on a wall map is of primary importance. Recognizable shape is of secondary importance, and true direction and distance are minor considerations except in special cases.

Additional factors in evaluating flat maps are simplicity, size, legibility, and color. Maps for beginners should be simplified, larger than is commonly the case, and colored so as to enhance both legibility and attractiveness. More advanced students may use more complex maps, but the same principles concerning size and legibility apply at all levels. Type must be more than ½″ in height to be read easily at a distance of 20 feet.

Appropriate globes for teaching purposes include simplified political globes for beginners, slated globes, political-physical globes, and air-age globes. Several sizes and mountings are available. While no ordinary globe can be read from a distance of more than a few feet, there are significant instructional advantages in using 16″ globes rather than smaller ones. Slated globes should be 20″ or more in diameter. Simplicity, visibility, and color considerations apply to globes as well as to flat maps.

Valuable supplementary map and globe materials for group and individual instruction include map slides and transparencies, slated wall outline maps, and chalkboard stencil outline maps. Plastic relief maps and pupil-made large-scale relief maps of local areas are likewise of great value in teaching map reading.

Effective use of globes and maps is based on map-reading readiness which is developed in the primary grades. Although no formal instruction in globe and map reading is usually given at the primary level, elementary concepts of location can be developed through field trip activities. An attractive simplified globe in primary-grade rooms stimulates questions which lead to initial understanding of the earth's sphericity.

Specific instruction in globe reading and later in map reading begins in the fourth grade and continues thereafter. The object of such instruction is twofold: to develop ability to "read" globes and maps and to develop facility in interpretation. The activities and materials for these purposes should be carefully graded in difficulty as the child progresses from simple to more and more complicated ideas. Wherever maps are used there should be a globe for ready reference.

Globes and maps are vitally important for understanding the world in which we live, but they are not ends in themselves. Like other visual and auditory materials, globes and maps are most effective when used in combination with pictures, text and reference books, slides, motion-picture films, field trips, and such other media and activities as will help the pupil understand what is being taught.

Suggested Activities

1. Have a committee of students make a survey of the wall map and globe materials in an elementary or secondary school. List the materials, by classrooms, according to type, size, projection (wall maps), mounting (globe), accessibility, and condition.
2. Analyze a list of globe and map materials in a given school and recommend materials which should be added, discarded, or replaced. Justify each recommendation in terms of principles discussed in this chapter.
3. Prepare a simple test on map reading and give it to the class. Include such items as the following:
    a. Alaska is nearly as large as the United States. (True or false.)
    b. Greenland is larger than Mexico. (True or false.)
    c. Name six countries through which the 40th parallel runs.
    d. In what general direction is Moscow from Chicago?
    e. Which is the most direct route from San Francisco to Japan:
        (1) Westward via the Hawaiian Islands.
        (2) Westward, but slightly north of the Hawaiian Islands.
        (3) Northwestward along the Alaskan coast and the Aleutian Islands.
        (4) Northward and nearly over the North Pole.

    Have the students check their own papers and discuss the implications of the errors that were made.
4. Using the grid comparisons method, analyze several wall maps including a Mercator projection, an azimuthal equidistant polar projection, a Lambert Equal Area projection of a continent, and a sinusoidal projection of Africa or South America. Explain the accuracies and inaccuracies of each map as to area, shape, direction, and distance. Tell how you reached your conclusions.
5. Have class committees secure catalogues from several map and globe companies and select specific globes and wall maps for (a) a primary room, (b) a sixth-grade room, (c) a junior-high-school social studies room, and (d) a high-school world history room. Explain the selections in terms of appropriateness to grade level and subject area, simplicity, legibility, color, and projection.

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8. Three-Dimensional Teaching Materials

Have you ever watched a baby play with his toys? Of course you have.

As he sits in his high chair, his chubby little hands grasp whatever he can reach. Somewhat clumsily but with great concentration he pushes, pulls, and maneuvers his rattle around until he gets a grip on it. Then, with evident pleasure, he bangs it on his tray for a while, samples its flavor when he can locate his mouth, and eventually dumps it overboard for the satisfying crash that follows. Pick it up for him and he will repeat the process, with many variations, again and again.

Now let us observe his mother on a shopping tour. At the vegetable counter she picks up and squeezes several heads of lettuce before finding one that will do. She spies some cantaloupes. Again, with a serious little frown, she goes through the squeezing routine as the grocer looks on with patient resignation. She thoughtfully smells several which "feel" pretty good—and then walks on without taking any. The watermelons *do* look better today so she briskly thumps several until one produces a satisfactory hollow note. She buys it.

Meantime the baby's father is on his way back to the office from lunch. He stops in at the garage to see the new "Century 8" which is having its premier showing today. He isn't really thinking of buying a new car—as a matter of fact he still has several payments to go on the "old bus" he bought last year—but like most other men he likes to keep up with new developments in automobiles.

So he goes in just to have a look. There it is—a beauty, all polished and gleaming with chrome. Subconsciously aware of the danger, he keeps a safe distance and circles casually to look at the car from all sides. "That trunk looks a bit larger this year; wonder if it is?" he murmurs to himself. "Hmm—it is at that," he notes as he lifts the lid.

Shortly, of course, he finds himself behind the wheel, turning it just a little to get the feel and noting appreciatively the comfortable "give" of the seat cushions. "Nice brake action," he observes as he cautiously pushes the pedal several times. He tries the horn ever so gently, but nothing happens because the garage has thoughtfully disconnected it. At this point a benign salesman moves in for the attack, interrupting his reverie. He extricates himself from the situation with appropriate dignity, but as he goes on to his office a trace of that elusive but unmistakable scent of a new car seems to linger in his nostrils.

THE PHYSICAL SENSES IN LEARNING

Even as you and I, the baby and his parents in these familiar situations are learning and experiencing through their physical senses. Although we "think" with the brain, the raw material for learning and thinking must come initially through one or more of the senses of sight, hearing, touch, taste, and smell. We can learn nothing without sensory impressions.

NEED FOR WELL-ROUNDED SENSORY EXPERIENCES

Furthermore, as we think about it, we recognize that the more complete, vivid, and accurate our sensory experiences are, the more effective is the learning which derives from them. Often cited to illustrate this point is the poem "The Blind Men and the Elephant" by John Godfrey Saxe.

It was six men of Indostan
  To learning much inclined,
Who went to see the Elephant
  (Though all of them were blind),
That each by observation
  Might satisfy his mind.

The *First* approached the Elephant,
  And happening to fall
Against his broad and sturdy side,
  At once began to bawl:
"God bless me! but the Elephant
  Is very like a wall!"

The *Second*, feeling of the tusk,
  Cried, "Ho! what have we here
So very round and smooth and sharp?
  To me 'tis mighty clear
This wonder of an Elephant
  Is very like a spear!"

The *Third* approached the animal,
And happening to take
The squirming trunk within his hands,
Thus boldly up and spake:
"I see," quoth he, "the Elephant
Is very like a snake!"

The *Fourth* reached out an eager hand,
And felt about the knee.
"What most this wondrous beast is like
Is mighty plain," quoth he;
" 'Tis clear enough the Elephant
Is very like a tree!"

The *Fifth* who chanced to touch the ear,
Said: "E'en the blindest man
Can tell what this resembles most;
Deny the fact who can,
This marvel of an Elephant
Is very like a fan!"

The *Sixth* no sooner had begun
About the beast to grope,
Than, seizing on the swinging tail
That fell within his scope,
"I see," quoth he, "the Elephant
Is very like a rope!"

And so these men of Indostan
Disputed loud and long,
Each in his own opinion
Exceeding stiff and strong,
Though each was partly in the right,
And all were in the wrong!

In a word, where sensory experience is involved, it should be as complete as possible. One learns better when all pertinent senses are employed. A motion picture of a bakery may be excellent, but it does not supply the heat of the great ovens or the delectable odors which are so much a part of the bakery environment.

CONCRETE EXPERIENCE IN LEARNING

You who have learned how to operate a motion-picture projector have an apt illustration of the importance of concrete experience. You can study a projector manual for some time without acquiring any operating skill. But by actually working with a projector for a short time under the guidance of an instructor you can learn quickly and easily. You "learn by doing."

Likewise, the natural science primary class acquires vivid and realistic impressions of how a butterfly emerges from its cocoon by watching the process in the classroom. Children in nursery school learn about getting along with other children from actual experience in getting along with them. Upper-grade pupils lay out a baseball diamond by using their mathematics; high-school social studies classes learn about their com-

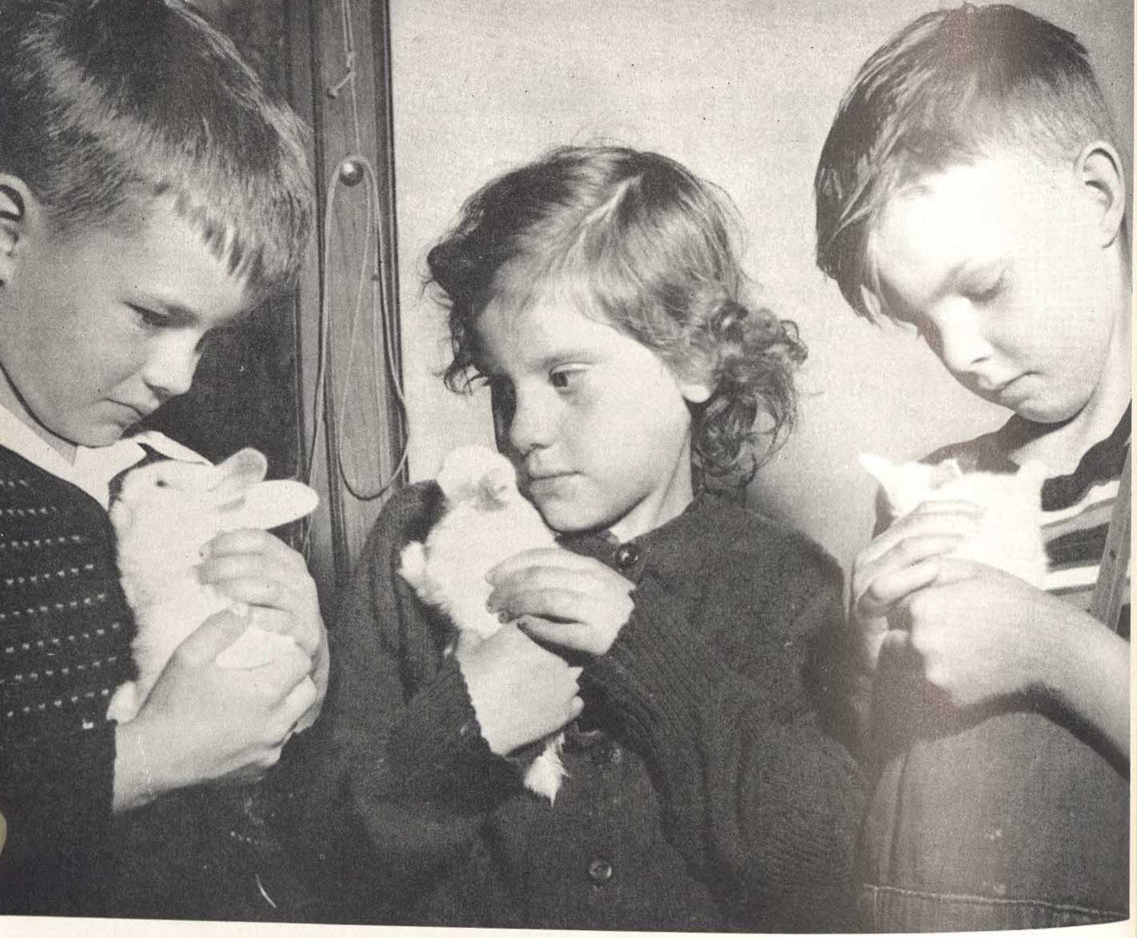

Fig. 8.1. Learning from live animals. (Courtesy of Janesville, Wisconsin, Public Schools.)

munity by surveying it at first hand. Students learn important things about government by taking part in student council activities.

In many such ways teachers apply what they know about the importance of first-hand concrete experience in learning. If all learning could be of this type, school would indeed be a fascinating place for every pupil. One reason why first-hand experience is so effective is that it involves the whole child—his physical senses as well as his intellect. It is a natural and satisfying way to learn.

MODIFIED SENSORY EXPERIENCE

Yet we know that many things of a physical character do not lend themselves well to first-hand learning. You can visit the local waterworks and power plant without gaining much understanding of how the great pumps and generators work. You can get a thrill out of watching a giant Diesel locomotive move a heavy train without having any idea of how it operates. You can observe the moon for a lifetime without acquiring an understanding of its phases. Incidentally, how would you explain the phases of the moon to an intermediate-grade class?

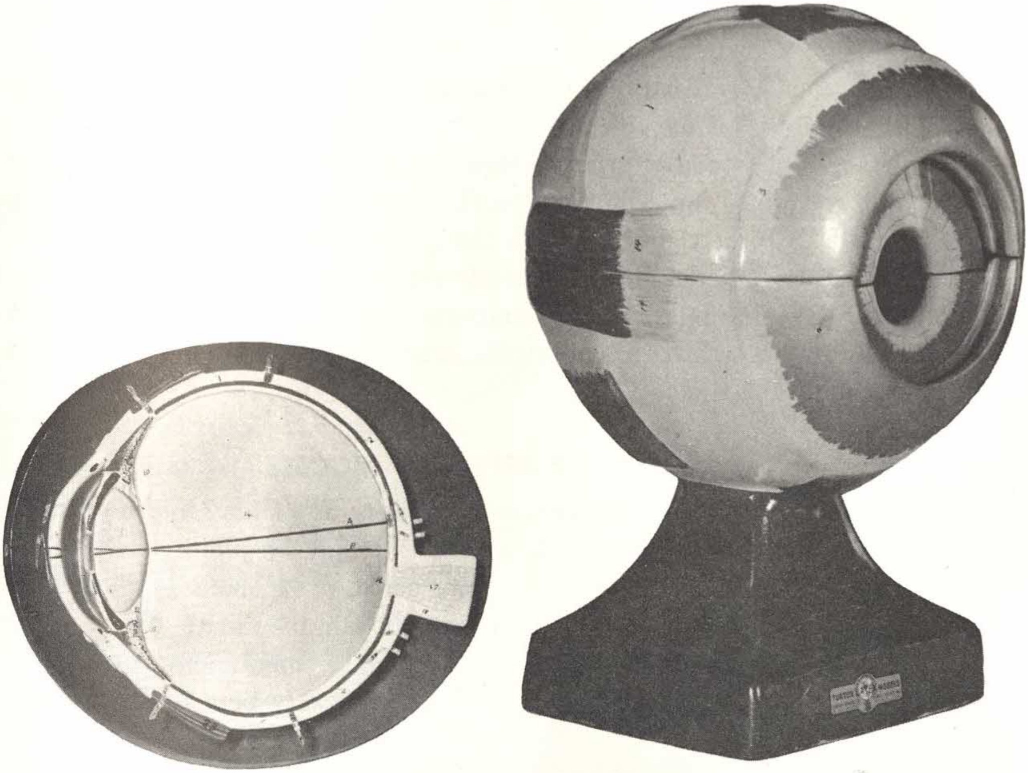

Fig. 8.2. (Courtesy of General Biological Supply House.)

The operation of some things like a pump, a generator, and an engine cannot be seen from the outside. You have to look at the interior to see how they work and even then their intricate construction may be baffling. The solar system can be seen to some extent but it is too vast to be understood from direct observation alone. Teachers need somehow to modify direct experience in such cases if they are to help their pupils learn efficiently. One way of doing this is by using models.

The social studies teacher also is continuously faced with the need for bringing realism into the study of the far places of the earth—mountains, plains, deserts, and jungles; of peoples and customs of long ago;

and of trade, industry, agriculture, and government in the many sections of our own country. He has a great wealth of printed materials to draw upon and he uses them extensively, but he knows that he needs somehow to give vivid meaning to the words his pupils read. So he uses a great variety of pictures, films, maps, models, objects, field trips, and other devices which make the learning experience more real and lifelike.

The point is well expressed by Sternig in a discussion of pupil-prepared visual materials:

"Learning from the printed page is only one method. It teaches best when related to something real in the actual environment which can be seen and handled and to which the printed ideas apply. All ideas are more easily gained and more securely held when learned through association with real things. This is a fundamental principle of education! It can hardly be considered a modern discovery but it is too often overlooked by teachers."[1]

CHARACTERISTICS OF EFFECTIVE MODELS

Models may be defined as *recognizable three-dimensional representations of real things.* The thing represented may be infinitely large, like the earth, or as small as an atom. It may be an inanimate object like a building, a monument, or a mine shaft; or it may be a living organism like a paramecium, an eye, or the human heart. The model may represent something as intricate as a turbo-jet engine or as simple as a piece of wire. It may be complete in every detail or considerably more simplified than the original.

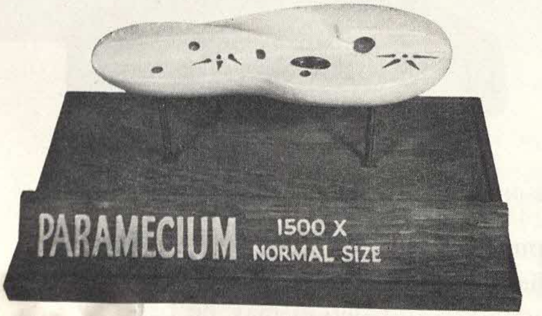

Fig. 8.3. (Photo by James L. Page.)

In the light of what we know about the importance of sensory experiences in learning, let us examine several characteristics of effective models for teaching purposes.

1. *They are three-dimensional.*

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[1] John Sternig, "Home-Made Visual Aids," *See and Hear,* April, 1946, p. 23.

Most objects around us have a third dimension; that is, they have depth or thickness as well as height and width. Effective models also have depth. This is one of their unique characteristics and it contributes significantly to their realism. If the third dimension is unimportant to comprehension, a model is probably unnecessary. In that case a picture or chart may serve as well or better.

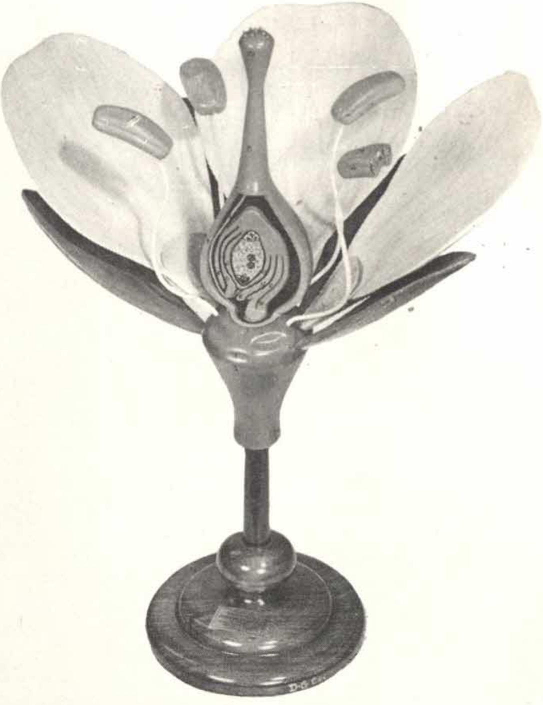
Fig. 8.4. Parts and their functions are clearly identified in a cutaway model. (Courtesy of Denoyer-Geppert Company.)

The human eye is a good example. A cross-sectional view like that in Fig. 8.2 (left) shows certain facts very well. Yet neither this view nor a frontal view can adequately convey the spherical shape of the eyeball; the relative positions of the rods, cones, and optic nerve; and the important relationship between the shape, the flexible lens, and the delicate muscles which control its focus. A model like that at the right in Fig. 8.2 is much more helpful in showing how the eye really functions.

2. *They reduce large objects or enlarge small objects to a size convenient for observation.*

We can see only a very small portion of the earth's surface even from an airplane. With a globe, however, we have a model which enables us to picture the whole earth without difficulty. The one-celled paramecium is much too small to be seen without a microscope, but a model like that in Fig. 8.3 makes it visible to an entire class.

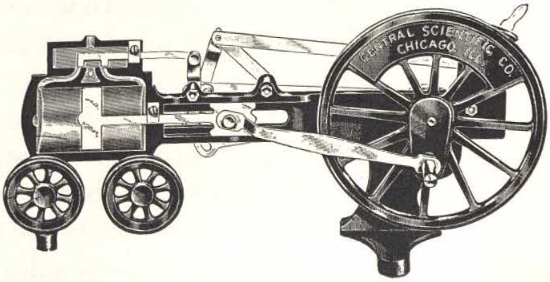

Fig. 8.5. Models simplify complex machines by omitting nonessential parts. (Courtesy of Central Scientific Company.)

Ideally, a model should be large enough to be seen readily by the

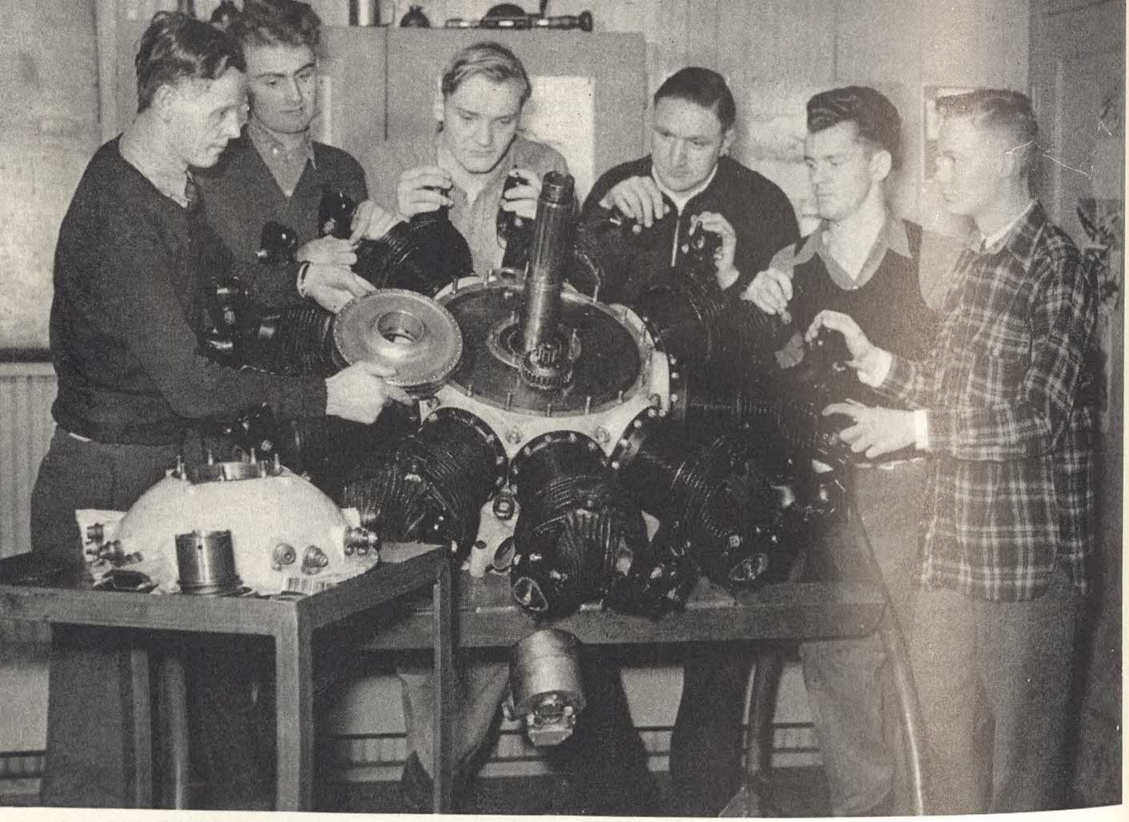

Fig. 8.6. The real thing provides the best opportunity for practical application. (Courtesy of Kenosha, Wisconsin, Vocational School.)

whole class. Frequently, however, the cost of large models and the limitations of storage space for them force a practical compromise in the form of smaller models than we would like.

3. *They provide interior views of objects which are normally covered or otherwise invisible.*

A cutaway model of a human tooth reveals the layers of enamel and dentine and the nerve which otherwise would be difficult to visualize. The rapidly spinning parts of a generator, a steam turbine, and a modern waterwheel are completely enclosed, but a simplified working model with removable or cutaway sides makes it possible to see and understand how they work. Similarly a flower model (Fig. 8.4) shows stamens and pistil with one side removed so that the process of fertilization may be easily traced.

4. *Nonessentials are removed so that fundamentals can be more readily observed.*

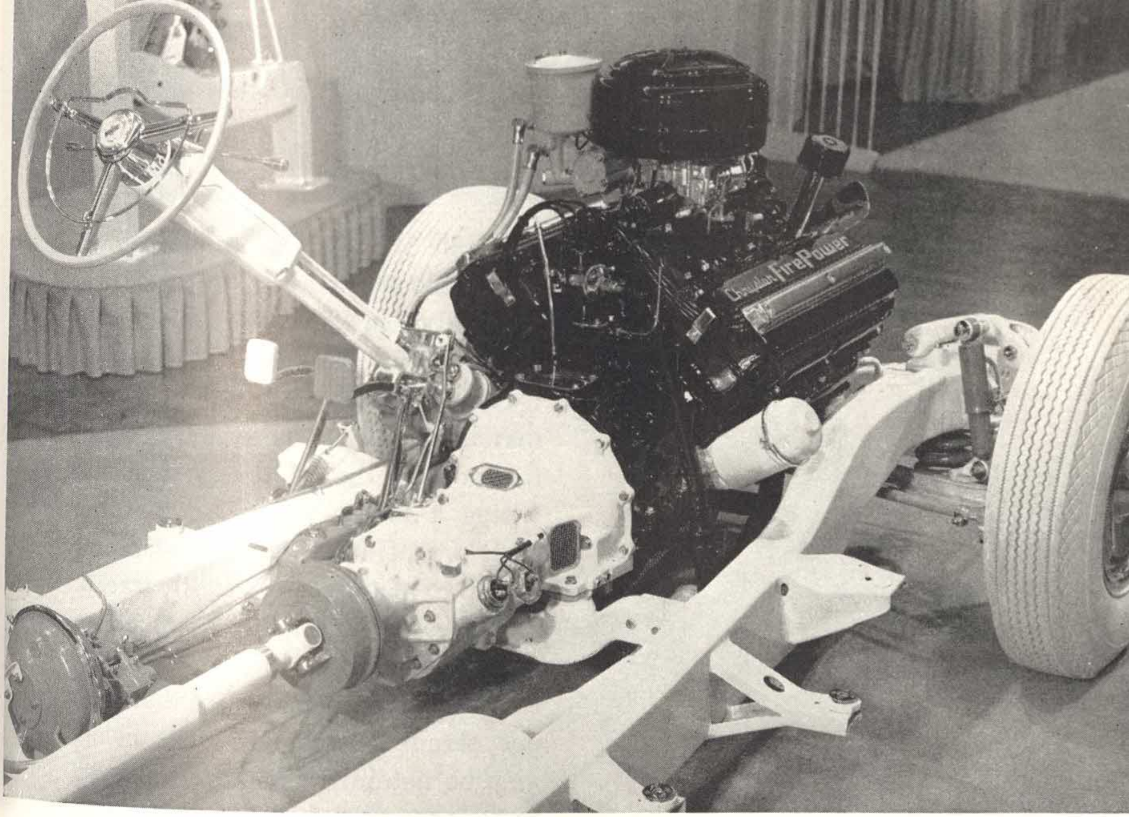

Fig. 8.7. Striking effects are achieved by color and surface variations. (Courtesy of Chrysler Corporation.)

As you watch a steam locomotive in a railroad station, you see a complex array of tubing, valves, shafts, levers, and other mechanisms in addition to the more familiar steam chest, drive shaft, and driving wheels. Steam issues from numerous points here and there as the giant pants and groans while the engineer pokes his long-snouted oil can into mysterious nooks and crannies. But if you have studied a model such as the one in Fig. 8.5, the scene takes on added meaning without sacrificing any of its inherent fascination.

The generator, the electric motor, and the steam turbine are other examples of complex mechanisms which can be readily explained with the help of simplified models.

The advanced student, however, needs models that are more complete. In auto mechanics classes he frequently has an actual engine with the block cut away to reveal the action of pistons, valves, connecting rods, and bearings. Aeronautics shops in colleges, vocational schools, and the larger high schools often have radial engines like that in Fig. 8.6, reversible pitch propellers, and sometimes complete airplanes for use in instruction.

5. *Models accent important features and minimize less important features.*

A center of attraction at any automobile show is the stripped-down chassis of a new model with the engine block cut away to reveal the moving pistons (Fig. 8.7). The pistons and other key parts are likely to be chromium-plated for better visibility and attractiveness. Cylinder walls may be painted green, the frame aluminum, and the ignition system and wiring a bright yellow so that the parts or operations the manufacturer wishes to feature can be easily traced.

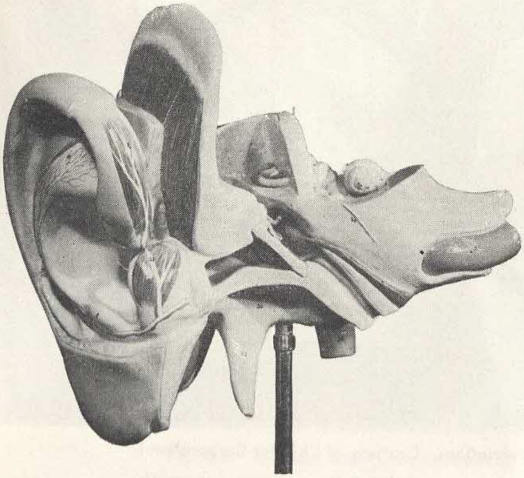

Fig. 8.8. Models with removable parts make comprehension easier. (Courtesy of Ward's Natural Science Establishment, Inc.)

The same principle is applied to models generally. Important and distinctive parts are colored so that each one stands out clearly. The colors may be natural (this is desirable on some anatomy models), but more often they are vivid for better visibility. Parts that are not essential to understanding the model are in less conspicuous colors. The engine block in Fig. 8.7, for example, may be in a dark or neutral color.

6. *The most useful models can be taken apart and put together again.*

The value of models in instruction lies not only in their three-dimensional realism but also in the fact that they can be examined by touch as well as by sight. The model of the eye in Fig. 8.2 can be taken apart so that each part may be examined individually. Fitting each part back in its proper position gives the student a degree of familiarity with the structure of the eye which is difficult to achieve in any other way. Furthermore, the interrelationship of the several parts is likely to be better understood.

A model of the human ear may be so constructed as to permit removal of the hammer, anvil, and stirrup bones (Fig. 8.8). The manner in which these three little bones fit together has much to do with understanding how we hear. Their function can be demonstrated more readily if they can be removed, examined, and replaced in the proper position.

THREE-DIMENSIONAL MATERIALS OTHER THAN MODELS

Thus far in this chapter we have considered the importance of well-rounded sensory experiences in learning and some ways in which models can provide them when direct, first-hand experiences are either impractical or impossible. We now consider several other types of three-dimensional materials which likewise provide opportunities for useful learning experiences. These are objects, specimens, mock-ups, and dioramas.

OBJECTS

There is little point in using a model if the real object can be brought into the classroom. You would not, for example, use models of Indian arrowheads, tools, and cooking utensils if you could secure the real objects. You might prepare a model of a wigwam and an Indian village if these were important elements in the social studies curriculum, but you would probably also have your pupils bring Indian beadwork, arrowheads, tools, utensils, blankets, and other crafts for display. Models and objects supplement each other in providing realism, authenticity, and interest.

Whereas a model is a recognizable three-dimensional likeness or representation of the real thing, *an object is the real thing.* These "things" are removed from their normal setting so that they can be brought together for study and analysis. This means that the object is not seen in its natural surroundings and therefore appears less "real" than it would in nature. A mounted robin in a display case filled with other mounted birds loses some of its realism even though it may be a good piece of taxidermy.

Another characteristic of objects as visual teaching materials is that they are complete units rather than parts of units. The robin just mentioned is, in appearance, a complete robin. A hammer or other tool; a frying pan; a vegetable, flower, or leaf; an insect or animal; a spear or a bow and arrow; an automobile engine and countless other things—all are considered to be objects only when they are complete. A hammer head without a handle, a squirrel's tail, and an arrowhead without a shaft are parts of objects rather than objects and are arbitrarily classified as specimens. The word "specimens" also includes certain objects which are

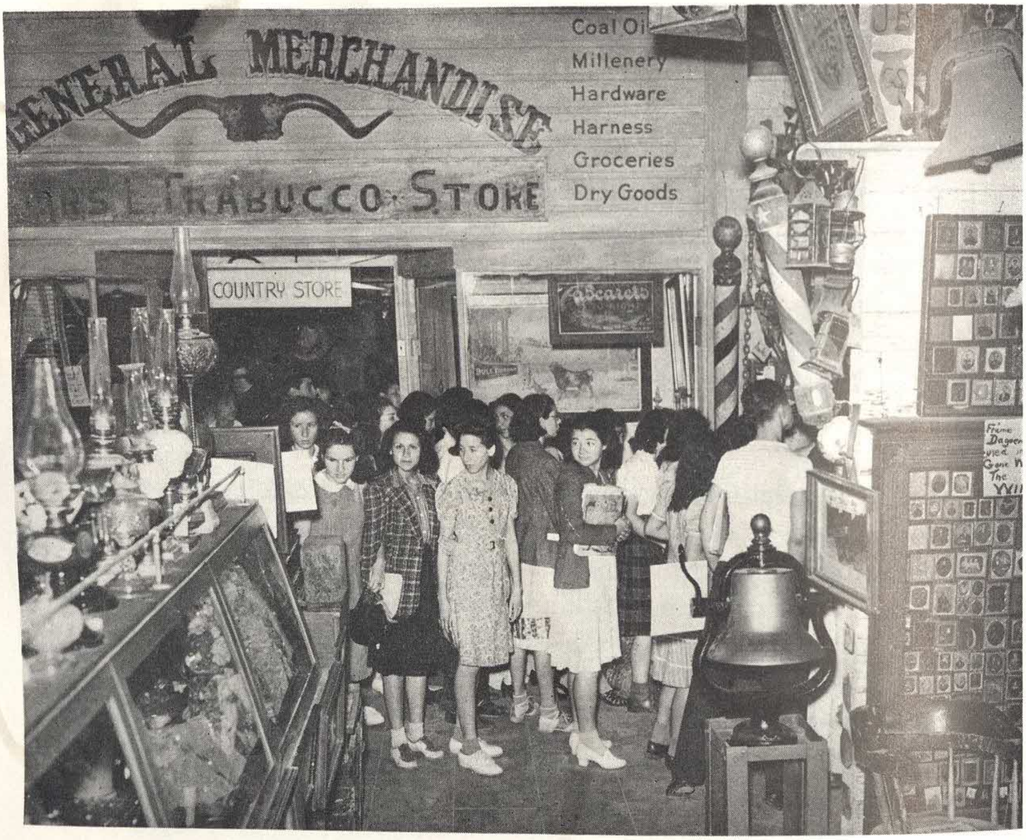

Fig. 8.9. Our grandparents lived with things such as these. (Courtesy of Los Angeles City Schools.)

typical of a class or group of objects; hence the two terms are not completely distinct in meaning.

Specifically, we may define objects as *real things which have been removed as units from their natural setting.*

You can think of many real objects which can be used to advantage in the classroom or laboratory. A few examples will suffice.

Science: Cocoons; rock collections; plants and flowers; fish, mice, worms, and other small animals; different kinds of coal, oil, and other fuels; samples of ore; sea shells; a telegraph key, radio set, doorbell, telephone; dry cells and storage battery.

Social Studies: Locally manufactured products; period and costume clothing; relics and souvenirs (as of political campaigns); coins and stamps; fuels; Indian relics; raw materials such as cotton, wool, flax, ores, and grains; early American utensils, toys, tools, furniture, spinning wheels, pictures, and books. The country store in Fig. 8.9 shows objects that were an integral part of such stores.

English: Period costumes; clothing and relics; letters and manuscripts; musical instruments; fabrics; stage props; tapestries; speaker's podium and microphone; printing type and layouts.

Mathematics: Slide rule, micrometer, vernier scale, and other measuring instruments; transit; sextant, compass, timepieces, and navigation charts; bottles and other containers for volume measurements; coins; drafting tools such as dividers, T squares, and triangles; and identical familiar objects for instruction in addition, subtraction, division, and multiplication.

Home Economics: Fabrics, textiles, thread, and various tools for dressmaking; utensils and foods; period costumes and clothing to show trends in design; raw textile materials such as cotton, wool, flax, and silk; wallpaper sample books; paint and papering tools; table settings.

SPECIMENS

Specimens and objects are similar in nature. In fact, as was said above, some objects may be classed as specimens. The distinction is based principally on the fact that specimens are usually typical of a class or group of objects, whereas objects do not have to be typical or representative to be classed as objects. A distinctive feature of specimens is that they must be typical of their kind, to be called "specimens."

Another distinction is the fact that a specimen can be any part of an object. Thus you might have a collection of birds' feet and claws, of tool handles of different sizes, or of neck-line patterns over a period of years. Such items are not complete in themselves and are therefore referred to as specimens rather than objects.

A specimen may be defined as *a typical object or part of an object which has been removed from its natural setting or environment.* One of the important advantages of such materials is that a collection of them allows us to classify them into groups, study them, and draw conclusions or generalizations. As Dale points out: "How long would it take a teacher or a class to gather in the essential information about minerals that is represented in a collection of rocks? It is simple enough to begin to

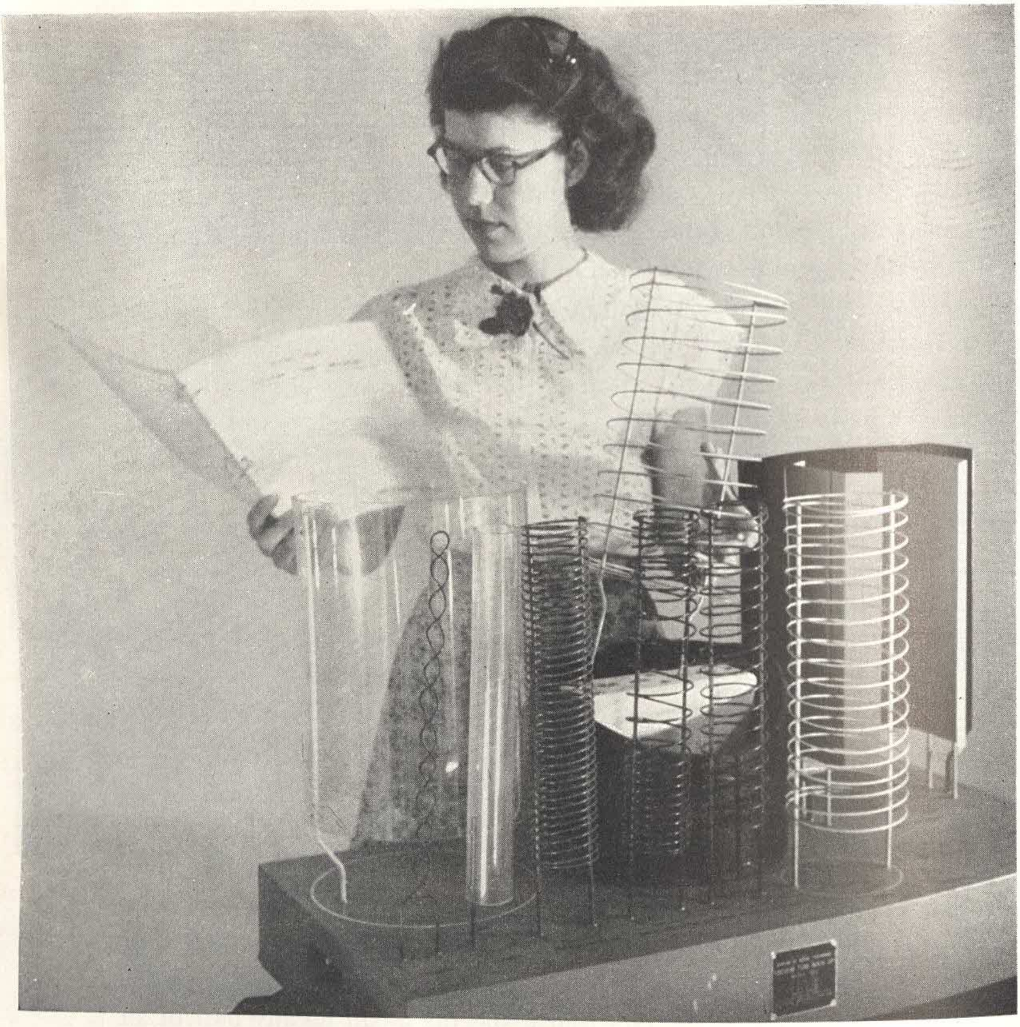

Fig. 8.10. Rearrangement of essential elements may help the learner comprehend. (U.S. Navy.)

classify, infer, and generalize with the collection before us. The same is true, of course, about any collection of objects and specimens."[2]

MOCK-UPS

A three-dimensional teaching device that has proved particularly useful in industrial and military training programs is the mock-up. The term "mock-up" suggests an imitation of a real thing—which in fact it is —but the imitation does not necessarily involve similarity of appearance as is true of a model. A few examples will make the distinction clear.

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[2] Edgar Dale, *Audio-Visual Materials in Teaching*, Dryden Press, New York, 1946, pp. 97–98.

The vacuum tube mock-up in Fig. 8.10 is designed to demonstrate the physical relationship of the elements common to several types of tubes used by the Navy. There are three different grids, any of which may be combined with the appropriate filament to illustrate a specific tube design. The mock-up is constructed to a scale approximately eight times the normal size for good visibility and the elements are coded in color and labeled for identification purposes.

Note that only the interior of the tube is shown. There is no familiar pronged base or glass or metal cover to identify it. These parts have been omitted so that the radio technician may concentrate on a single important section of a vacuum tube. The real tube, in other words, has been rearranged as well as simplified in order to stress certain elements.

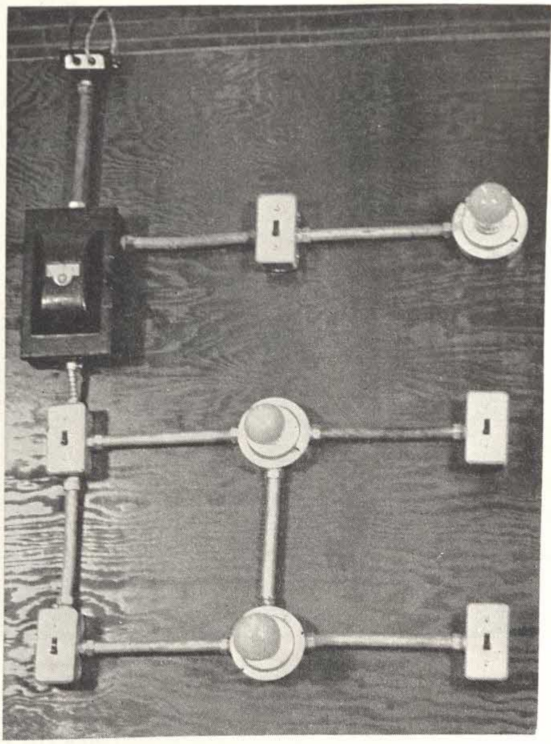

Fig. 8. 11. A mock-up reveals elements which would normally be concealed. (Courtesy of Kenosha, Wisconsin, Vocational School.)

Another type of mock-up is shown in Fig. 8.11. This simplified wiring and light-switch hookup for several rooms incorporates a transformer which reduces the line voltage to 25 volts, thereby eliminating the possibility of fire from overloaded circuits. Normally the wiring and switch connections are concealed in the walls, and they run to a number of rooms. It would be impossible to see, from any one point, the effect of turning on a remote control switch—in the front hall, for example.

In this mock-up a typical circuit is mounted on a small panel so that the effect of any combination of circuit hookups can be seen at once. The conduits, switches, and fixtures are exposed on the face of the panel, and the wires to the transformer are exposed on the back of it. One can see quickly just how the installation should be made. As in the vacuum tube

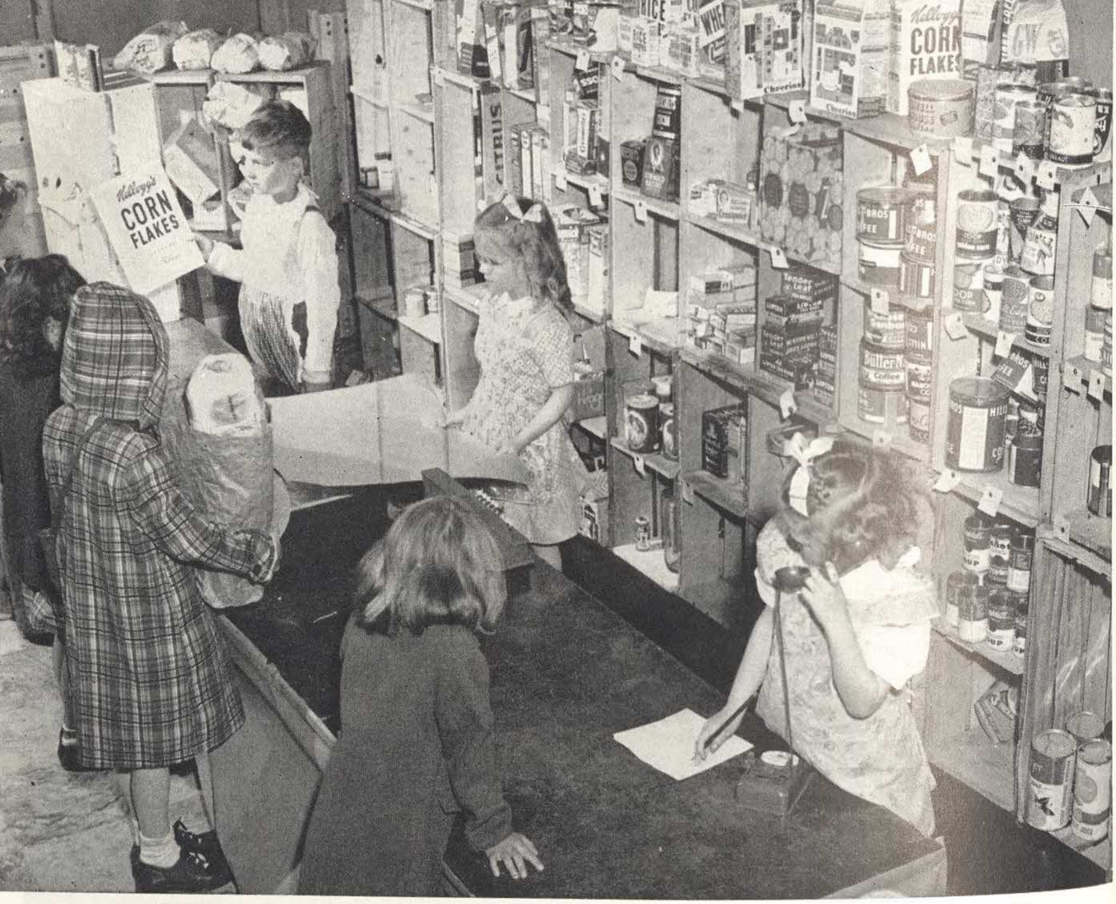

Fig. 8.12. These youngsters enjoy learning in their own grocery store. (Courtesy of Janesville, Wisconsin, Public Schools.)

mock-up, there is a purposeful rearrangement of a real circuit. There is also a degree of simplification so that the class sees only those elements that are essential to understanding how to hook up an installation of this type.

A simple kind of mock-up is frequently used by kindergarten and primary teachers when they have their pupils build a grocery store (Fig. 8.12), a Santa's toy shop, or a railroad train out of blocks or orange crates. The purpose in this case is to train the children in coöperative activity, reading readiness, or perhaps elementary number concepts. The devices used are mock-ups, however, in that certain elements of the real experience are retained while others are purposely eliminated.

Industrially, mock-ups are finding various practical applications aside from training. The interior of our luxury airliners is often the result of intensive study of cutaway mock-ups of cabin sections made on a scale of one-tenth. From these are determined such factors as number of passengers, weight, storage space, food handling, and cabin heating—all of them essential problems that must be worked out before the liners themselves can be built.[3]

An interesting application of mock-ups was their use by architects and construction companies in building the Firestone Memorial Library at Princeton. By means of mock-ups, various ceiling heights, lighting fixtures, stack arrangements, and even exterior stonework patterns were determined. In the latter case, the construction company built three different types of wall sections about six feet high and side by side. It was thus possible to compare styles of masonry and kinds of materials. Officials of the company expressed their satisfaction with mock-ups for this type of construction planning: "Mock-ups are proving to be of great value on large-scale production projects. The small additional cost is easily offset by preventing a client's possible dissatisfaction resulting from the difficulty of visualizing, from blue prints and descriptions, the installations as they will actually appear."[4]

DIORAMAS

One of the most fascinating forms of three-dimensional materials is the miniature diorama. The diorama's universal appeal was well expressed in the study of the New York and San Francisco World's Fairs made by the staff of the New York Museum of Science and Industry:

> The popularity of the diorama is based on the speed and vividness of the impression which it makes and on the directness of its appeal. For most persons words and pictures are decidedly incomplete experiences; their imaginations cannot fully bridge the gap to reality. They need the look and feel of actual things to awaken the quality of perception which leads to an emotional response. Everybody who has to teach others soon finds his way to concrete illustrations, and the diorama extends the range of such illustrations to the limits of mechanical and artistic inventiveness.
>
> Besides its virtue as an illustrative device the diorama has the charm of ingenious novelty. There is often an enchanting quality about it which it shares

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[3] David O. Woodbury, "Your Life Tomorrow," *Collier's*, April 28, 1945, p. 61.

[4] "Mockups of Buildings Aid Laymen in Visualizing Projected Construction," *Scientific American*, November, 1947, p. 219.

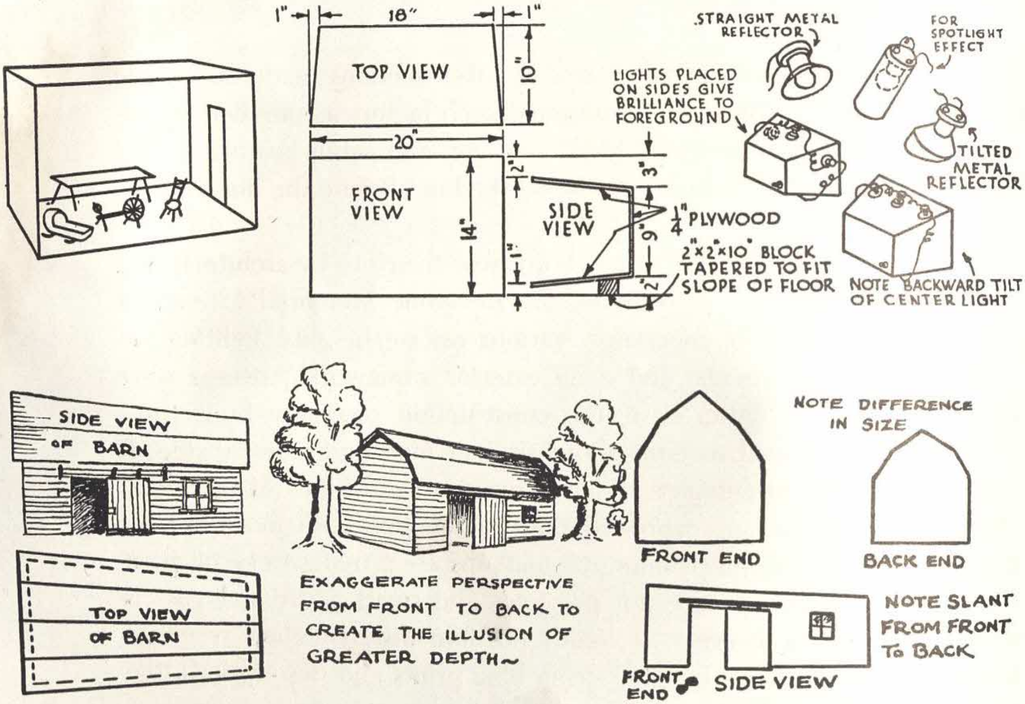
1"
18"
1"
TOP VIEW
10"
20"
FRONT VIEW
14"
SIDE VIEW
2"
3"
9"
1"
2"
1/4" PLYWOOD
2"×2"×10" BLOCK TAPERED TO FIT SLOPE OF FLOOR
STRAIGHT METAL REFLECTOR
FOR SPOTLIGHT EFFECT
LIGHTS PLACED ON SIDES GIVE BRILLIANCE TO FOREGROUND
TILTED METAL REFLECTOR
NOTE BACKWARD TILT OF CENTER LIGHT
SIDE VIEW OF BARN
TOP VIEW OF BARN
EXAGGERATE PERSPECTIVE FROM FRONT TO BACK TO CREATE THE ILLUSION OF GREATER DEPTH
FRONT END
NOTE DIFFERENCE IN SIZE
BACK END
NOTE SLANT FROM FRONT TO BACK
FRONT END
SIDE VIEW

Fig. 8.13. *Top:* How to construct a simple diorama. *Bottom:* Perspective in a diorama is achieved by exaggerating size differences from front to back. (Courtesy of *See and Hear.*)

with the puppet show and with toys—the spell of a fantastic evocation of reality in miniature.[5]

A diorama is a three-dimensional "picture" of a scene done with miniature objects and with backgrounds in actual perspective. It has real depth in that larger objects are placed in the foreground, with smaller objects behind them; a photographic or painted background is further scaled down as it would appear in reality. The scene is usually set up on a miniature stage (Fig. 8.13, top).

The objects in a diorama, such as figures, buildings, and trees, are seldom done to scale. A building is made to look smaller at the far end in order to exaggerate depth. The whole idea is to represent the illusion the eye perceives. As you look down the street, for example, people and buildings far away appear to be smaller than those close at hand and the street itself seems narrower. This illusion, called "perspective," is fundamental to any representation of depth (Fig. 8.13, lower).

If you have small figures to begin with and in addition exaggerate the perspective, you can give an effect of considerable depth in a relatively small space. This illusion, well carried out, gives the diorama a vividness and realism which are very striking.

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[5] *Exhibition Techniques,* New York Museum of Science and Industry, 1940, p. 115.

The modern museum makes extensive use of dioramic exhibits to show scenes of distant places and historical periods. Teachers in schools in the vicinity of such museums are well aware of their vast educational potential. The Milwaukee County Museum, the Los Angeles County Museum, and the well-known Cleveland Youth Museum are among those which are doing outstanding work in coördinating their wealth of historical and current materials with school programs.

Even though such museums are not available to most schools, the effectiveness of the diorama need not be lost. Good dioramas can be constructed by the students from inexpensive materials that are easily obtainable. Leaves cut from paper and dipped in stained wax are good for some kinds of tropical foliage; fine sawdust stained green will do for grass; the furrows of a plowed field can be imitated by running a comb over a bed of wet clay; and pieces of green rubber sponge do very well for shrub and tree foliage.

Detailed directions for constructing dioramas are given in two well-illustrated articles by Jenkins.[6] His summary points out several concomitant values of constructing dioramas in schools.

> The motivation and conception of the diorama is of greater value than the actual construction. Carefulness of workmanship, although desirable, may well be subordinated to the many educational values. The desire for realism is usually present in large numbers of teen-age children, and it can be achieved with practice in interesting tasks.
>
> Diorama and model making call upon a variety of skills and can encourage group work in many stages of development. The results will serve over a period of years.[7]

USING THREE-DIMENSIONAL MATERIALS IN TEACHING

CLASSROOM USE

A high-school history teacher whose class was visited by one of the present authors on several occasions said: "I would hardly know how to teach history without using the models and objects we have collected over the years I have taught in this school. They seem to help my pupils actually to relive the events and times we are studying. One of the things that pleases me greatly is that many of our former students who have graduated keep coming back to see how our collection is growing."

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[6] J. W. Jenkins, "Let's Make a Diorama," *See and Hear*, November, 1948, pp. 36–37, and January, 1949, pp. 35 ff.

[7] *Ibid.*, January, 1949, p. 42.

Many of these former pupils, she said, continued to contribute to her unique collection for years after they graduated. Neatly stowed away were Indian relics from many parts of the country; objects from such faraway places as Greece, India, China, and Japan—some of them collector's items—and a rather extensive array of foreign stamps, coins, menus, dolls, pictures, eating utensils, and the like. There was also the usual collection of captured weapons, insignia, and other mementos of World War II. There were a few garments of an earlier day in this country, and a number of very good pupil-made models including a stockade, a Conestoga wagon, and a clipper ship.

One had only to watch this teacher at work for a short time to appreciate that her pupils' unusual interest in things historical stemmed in large measure from her own genuine and infectious enthusiasm. She was an excellent teacher.

But her classroom itself also helped to bring history alive. Objects and models pertinent to the lesson were much in evidence. She utilized pictures and old prints liberally and there seemed to be an interesting story in back of each one. Objects were discussed in context and examined at close range; all but the most fragile were handled by the students. When questioned about damage and loss of articles, she said that there was virtually none; the students were proud of their collection and treated it accordingly.

Selection

By this time you will have sensed that objects and models, like other audio-visual materials, should be used when they can make a unique contribution to the lesson. Three-dimensional materials are more real to the student than pictures because they have depth and substance. They can be seen and handled, and sometimes smelled or tasted, thus making for a more complete use of the sensory mechanisms by which we acquire information.

Thus in learning situations where the third dimension is important, a

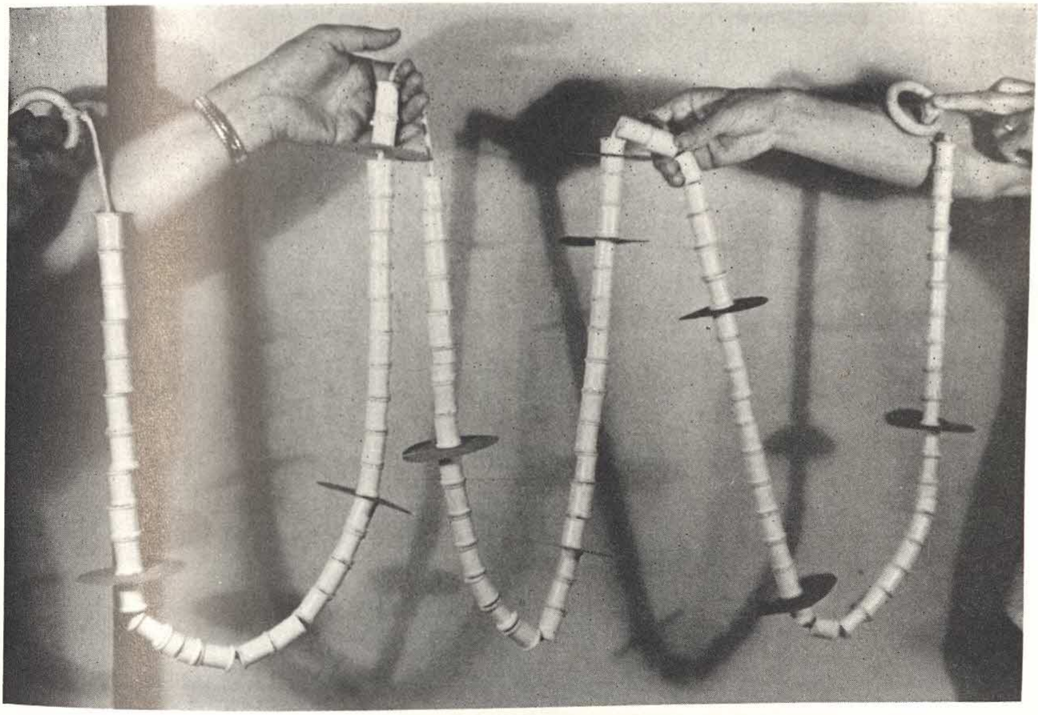

Fig. 8.14. A chain of spools is useful for counting exercises. (This and Fig. 8.15 courtesy of Mary R. Barry, Racine, Wisconsin, Public Schools.)

model, an object, a specimen, or a mock-up should be used if you can find what you want. If nothing suitable is available, perhaps something can be made without too much difficulty.

For an English teacher it may be a model of the Globe Theater constructed from cardboard. For a mathematics class it may be a set of cubes, spools on a string (Fig. 8.14), a nest of tin cans, or a shoestring and a circle of wood (Fig. 8.15). Stockades, Conestoga wagons, and wigwams are practically standard equipment in the social studies classroom and most of them are made by the pupils. The science class can easily construct a model of a tooth, such as is shown in Fig. 8.16.

In all such situations the question must be answered, "Is the need important enough to warrant the amount of time and effort involved in making this model?" The same question applies, of course, to collecting specimens and preparing displays. It cannot be answered categorically or in terms of subject-matter learning alone, because, as every experienced teacher knows, the values of such activities to pupils in terms of coöperative experience, individual recognition by the group, and satisfaction in accomplishment may at times far outweigh the value of the information acquired.

Principles of Use

Models have a natural appeal which suggests some ideas regarding their effective use in instruction.

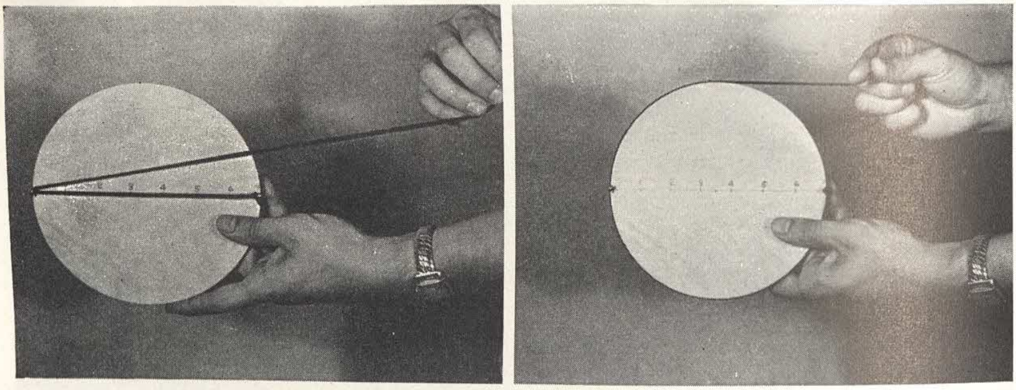

Fig. 8.15. A shoestring and a circle of wood make π simple to demonstrate.

1. *Make certain that all the pupils can see.* Ideally every model would be large enough to be seen easily by everyone in the class at one time. Practically this is out of the question because of such factors as space, cost, and storage facilities. So, as a compromise, the three-dimensional materials should be large enough for all to observe the general features, closer examination being left for group and individual study.

2. *Use supplementary materials along with models.* When you use a model of a flower to explain pollination to a biology class you may wish to use a large wall chart like that in Fig. 8.17 for details so that all the class can see it readily. You work back and forth between the two to establish clearly the relationship between parts and functions. At the appropriate point you may also show a sound film which uses animation to visualize the fertilization process. You will doubtless bring in some real flowers to make concrete the information acquired.

In a word, as with other visual and auditory materials, for maximum benefits you *integrate* the use of models and other teaching materials.

3. *Be sure that correct concepts of size are given the pupils.* One of

the dangers in using models is that the pupils may get distorted ideas of actual size unless care is taken to guard against this in teaching.

A curator in the Milwaukee County Museum told of a case which illustrates this point. An intermediate class studying some Polynesian exhibits was particularly interested in a small-scale diorama of a native village. Actual coins used by the natives were included in the exhibit. Since the people in the diorama were only a few inches tall, some of the crude coins were nearly as large as the natives themselves. In evident perplexity a number of pupils asked how the natives managed to carry their money around with them.

Since models are usually larger or smaller than actual size, it is important to make sure that pupils do not receive distorted impressions. Teachers who use models frequently should be careful to emphasize correct size concepts in some manner. One way of doing this is by showing the actual object along with the model. Another is by making comparisons with familiar objects. For example, a picture of a steam turbine in a power plant is effectively used with a small model of a turbine provided that a workman is shown in the picture to indicate the relative size of the giant turbine.

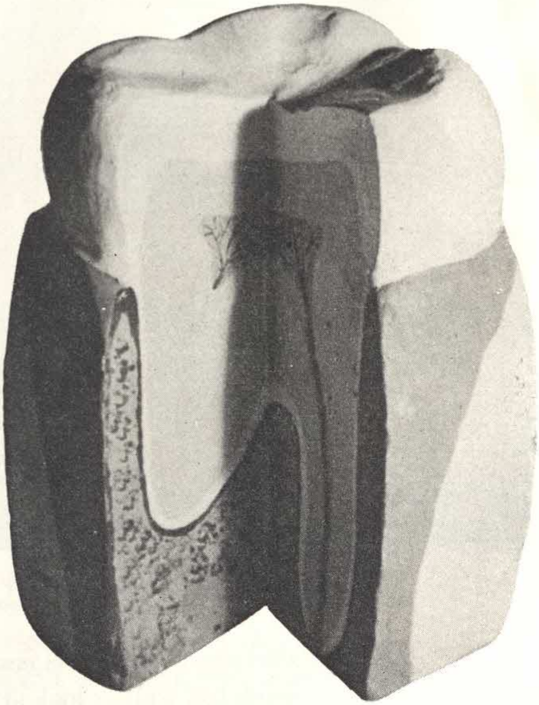
Fig. 8.16. Models of this type are easily made from plaster. (Photo by James L. Page.)

4. *Arrange for first-hand examination of three-dimensional teaching materials.* Since one of the major appeals of objects, specimens, models, and mock-ups is their three-dimensional realism, this appeal should be used to stimulate curiosity, interest, and imagination. Unlike pictures, such materials appear differently from every angle and hence should be seen from various points. One of the best ways of providing for this is to have students work directly with the materials.

Further, since the use of models offers an opportunity of providing

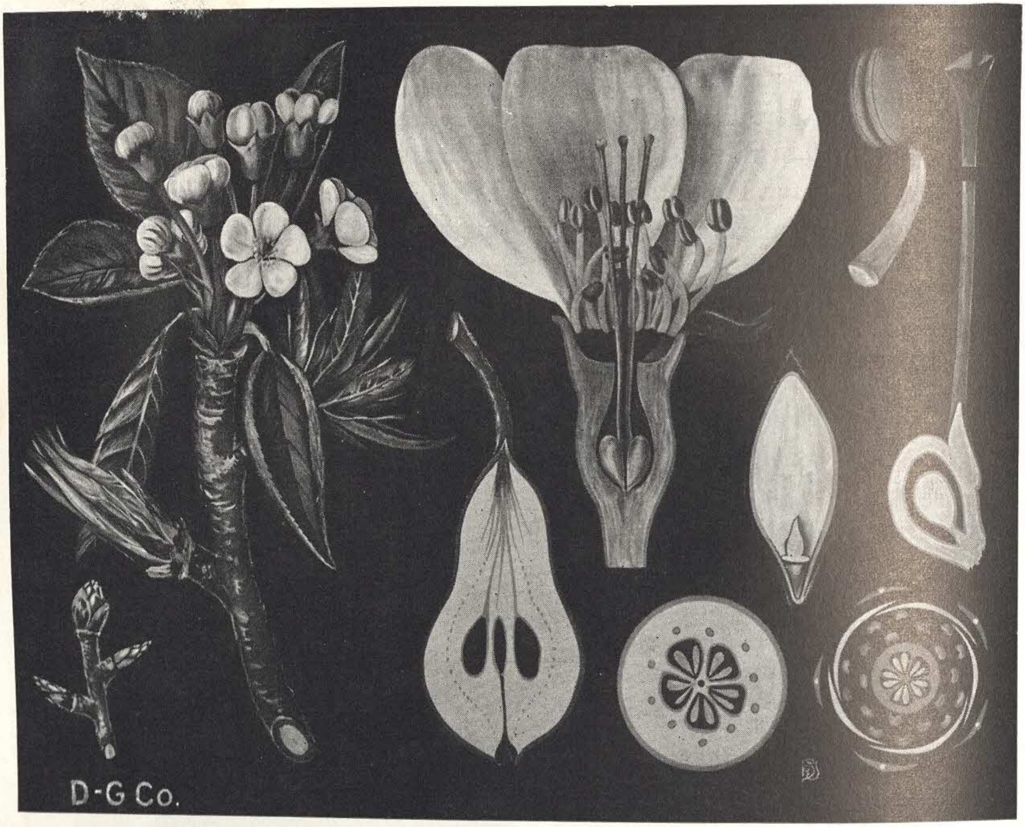

Fig. 8.17. Wall charts and models effectively supplement one another by combining adequate size for class observation with three-dimensional realism. (Courtesy of Denoyer-Geppert Company.)

well-rounded sensory experiences, there is good reason to let the students handle a model as well as look at it. To do so makes the experience more concrete, tangible, and vivid to the learner. Some models and specimens are too fragile to permit handling, and in general their value is considerably lessened by this fact. Commercial display people well know the value of letting customers handle merchandise: "Proximity is temptation. Show a woman a black and white advertisement in a newspaper and her interest is piqued; present the real article in a store window and she wants it; let her touch it and (as the self-service trend is proving) the sale is made."[8]

The case is even stronger for models that move or can be assembled and disassembled. Anyone who has seen intermediate-grade pupils at work making their own models or junior- and senior-high-school pupils'

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[8] Tina Safranski, "Window Dressing," *Harper's Magazine*, July, 1944, p. 178.

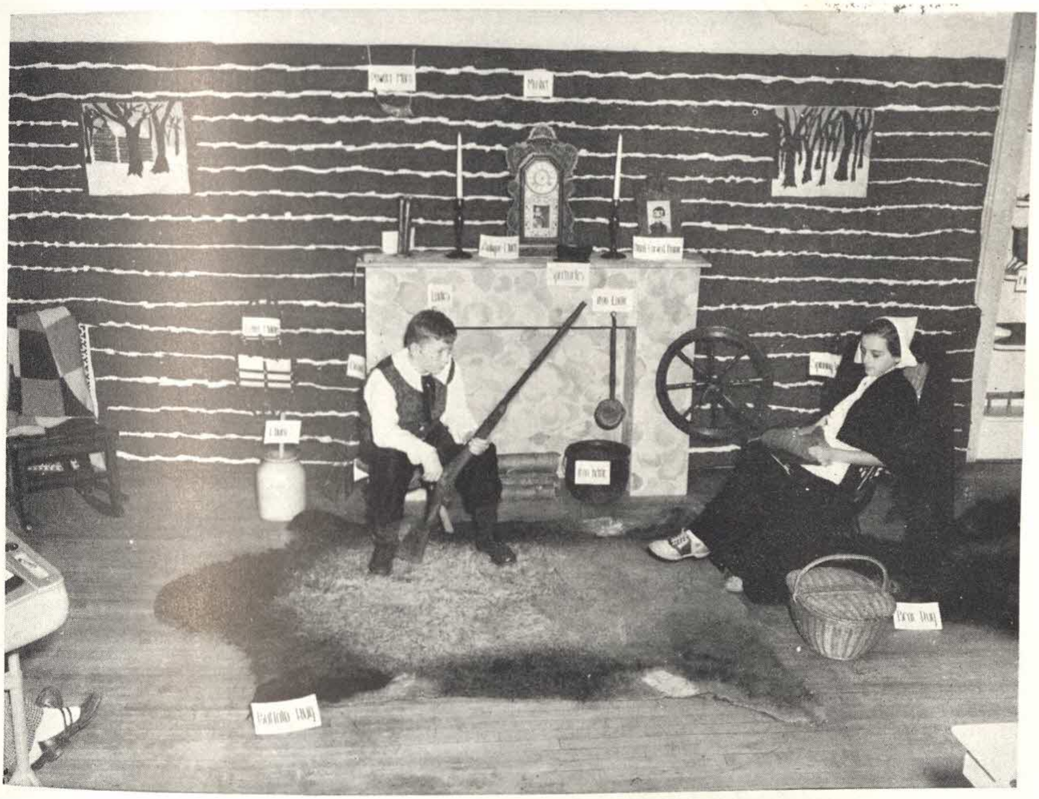

Fig. 8.18. Real objects help vitalize pupil dramatizations of pioneer life. (Courtesy of Fond du Lac, Wisconsin, Public Schools.)

absorbed concentration on their collections of insects will have little question of their ability to handle models and specimens with care. There seems to be little reason for having these valuable tools of instruction if the students are not allowed to handle them.

5. *Show only such models and other three-dimensional materials as apply to the work at hand.* Storage problems frequently lead to classrooms being cluttered with all manner of objects, specimens, and models. At the proper time they are hauled down, dusted off, used, and then put back on the shelf for another semester or year. Too often these collections are in full view of the students at all times, distracting attention and tending to limit their effectiveness when used for instruction.

While some materials like aquariums, terrariums, and globes lend themselves well to continuing observation and interest as part of the classroom environment, the great majority of teaching materials are inappropriate for this purpose. The enterprising teacher sees to it that they are stowed away out of sight until the psychological moment arrives for using them. He realizes that their interest value is thereby greatly enhanced and that attention can be focused more effectively if unrelated materials are not visible.

Like a good merchandiser, the teacher knows that he must catch and hold his pupils' attention before he can "sell" his ideas effectively. Some teachers cover the glass in their classroom storage cabinets with colored drawing paper; others ask the art department to use this space for simple, appropriate designs which have a decorative effect without being distracting. When no cabinet or other storage space is available in the classroom, cartons or boxes may be used. They should be marked for identification and stored in closets or on shelves in empty parts of the building.

USE IN DISPLAYS AND EXHIBITS

Aside from the classroom itself, three-dimensional materials are most widely used in educational displays and exhibits. Although we are inclined to think of displays and exhibits primarily in connection with retail selling, museums, trade shows, and fairs, they have many useful applications in schools as well.

Most schools have Parents Nights, Hobby Shows, or annual exhibits of some kind. Vocational schools and technical high schools make regular use of displays to show the work done by various departments. Most of the newer elementary- and second-school buildings have built-in display spaces in the corridors for educational exhibits during the school year. In all of these, three-dimensional materials play a prominent part.

Display and Exhibit Defined

Though used interchangeably in everyday conversation, the terms "display" and "exhibit" differ somewhat in meaning. The word "display" has derived its most widely accepted meaning from commercial applications. Advertising men use it to denote newspaper or magazine layouts, posters, painted signs, and arrangements of merchandise as in window displays.[9]

An exhibit, on the other hand, has an educative or informational purpose rather than a largely commercial one. A second distinction is that three-dimensional materials are used more extensively in exhibits than in

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[9] Lane M. Palmer, *Exhibits—Their Place in Education,* Unpublished Master's Thesis, University of Wisconsin, 1947, p. 4.

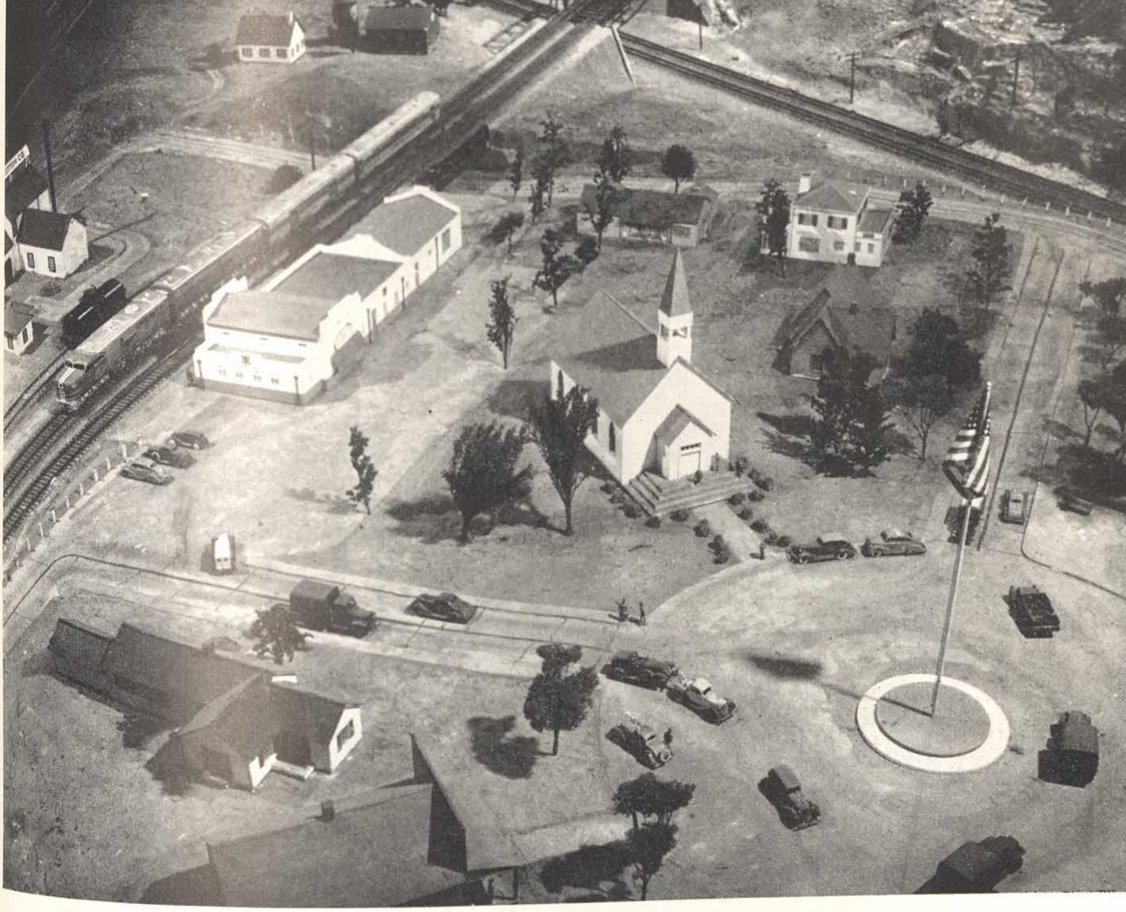

Fig. 8.19. The model railroad exhibit appeals to young and old alike by combining inherent interest, movement, and realistic detail. (Museum of Science and Industry Photograph.)

displays. The latter distinction is probably more helpful since commercial firms have presented many outstanding educational exhibits in the Chicago, New York, and San Francisco World's Fairs and also in various state fairs and trade expositions such as the Chicago Railroad Fair. Few who have seen them would question their educative value even though public good will and eventually increased sales were unquestionably important in the exhibitors' aims.

For our purposes, then, a display may be defined as *an arrangement of materials, chiefly two-dimensional, which is designed to convey to the observer impressions and information on a specific subject which may or may not be educational in nature.*

An exhibit is *an arrangement of realistic materials, primarily three-dimensional, which is designed to inform the observer about a subject of* *educational significance.* (See Fig. 8.19.) Note that an exhibit may include posters, charts, graphs, and pictures; it may incorporate such devices as motion pictures or recorded lectures. Its essential physical characteristic, however, is a visual impression of realism created in substantial measure by three-dimensional rather than flat materials.

Preparing a School Exhibit or Display

Having decided that a display or exhibit is needed, how do you go about preparing it?[10]

1. *Establish your purpose.* As in any other educational endeavor, you must know first *what* you wish to accomplish and then plan *how* it is to be done. Bruno Gebhard of the Cleveland Museum of Health gives this sound advice:

> Exhibits are too often made with a minimum of clear thinking and planning. A vague idea is not enough and even a splendid one needs much detailed work. You would not dare to face a microphone without a script or film a motion picture without a scenario. Treat your exhibit with equal respect. Put down its purpose in writing; describe the basic idea; be specific about the facts and figures to be used; the technique by which they will be shown. Your manuscript should also include complete copy. . . .[11]

2. *Make a plan.* Your second step is to carry the plan to the "blueprint" stage. Work it out on paper, showing measurements, design to be followed, color scheme, lettering, and placing of materials. The art teacher can help you here, because effective exhibits and displays always incorporate sound art principles. One of these involves simplicity, another design or arrangement, and a third color.

As to *simplicity,* McDougall has a suggestion worth remembering: "Poster and display work go hand in hand. A poster must not be loaded with copy. The poster and display must convey one central idea. If you have more to say, put it in another exhibit."[12]

The *design* itself should be simple. Basically designs are merely arrangements of various lines which lead the eye where you want it to go

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[10] See pp. 535–536 and 545–547 for sources of display and exhibit materials.

[11] Bruno Gebhard, "How to Make and Use an Exhibit," *Exhibits—How to Plan and Make Them,* National Publicity Council for Health and Welfare Services, New York, 1946, p. 5.

[12] Kenneth L. McDougall, "Tips for School Exhibitors," *Minnesota Journal of Education,* May, 1950, p. 23.

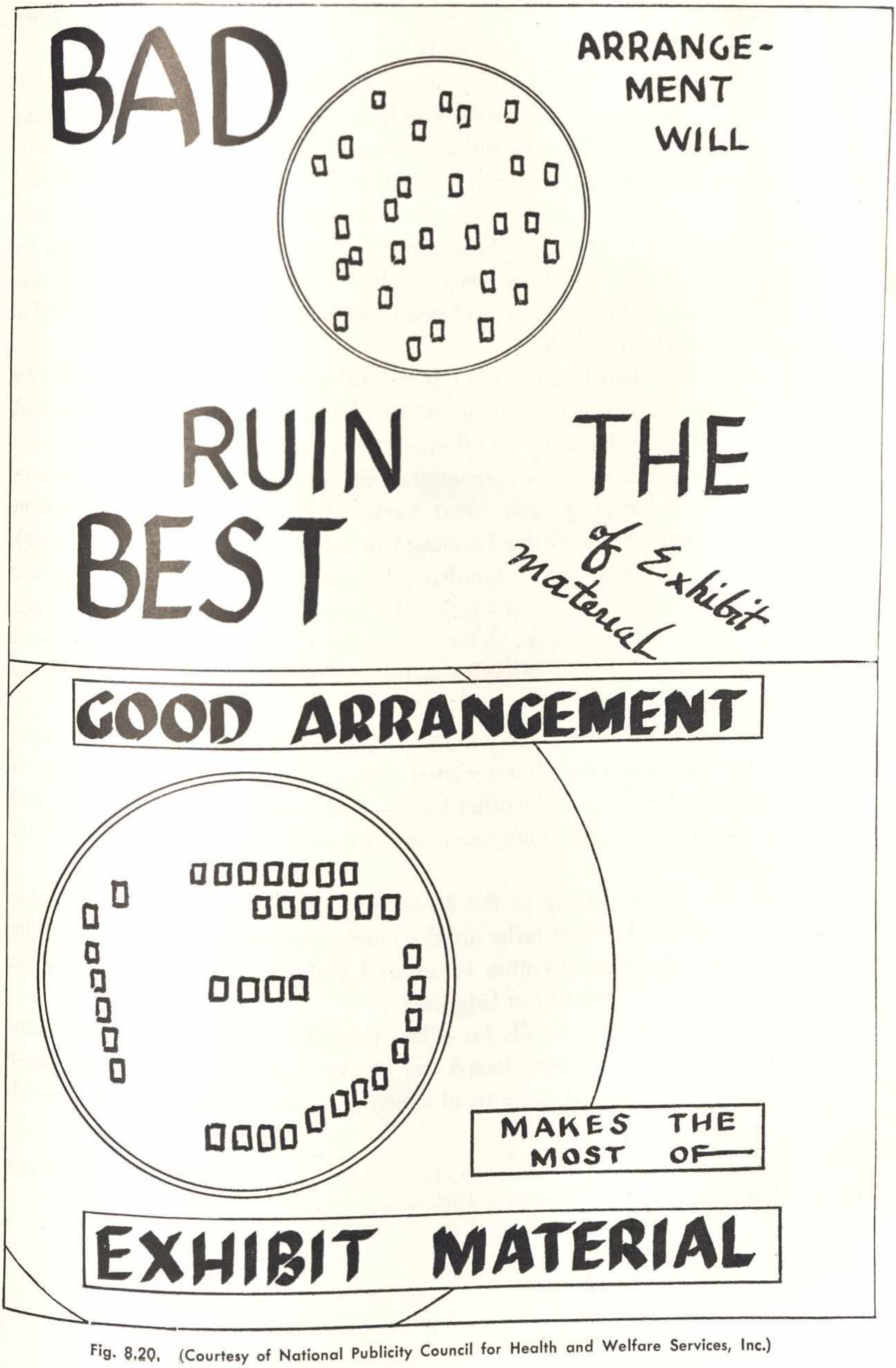

Fig. 8.20. (Courtesy of National Publicity Council for Health and Welfare Services, Inc.)

and at the same time produce a pleasing overall effect. Notice the effect of the good and bad arrangements in Fig. 8.20.

Color is an important factor in any display or exhibit. It can be used for such purposes as attracting attention, showing boundaries, indicating classifications and groups, and providing effective backgrounds for materials and lettering. Along with lighting and good design, color is regarded as fundamental by professional exhibitors such as the New York Museum of Science and Industry: "From our experience here at the Museum we have found that the three part formula of sound architectural design, proper use of illumination, and good color effects, is the first essential of good exhibition practice."[13]

The color wheel (Fig. 8.21) is helpful in working out effective color harmony. In any typical color wheel the colors directly opposite each other are complementary and work well together. Likewise any three colors equidistant from one another on the wheel provide a pleasing three-color harmony. The artist varies these combinations by adding black to one of the colors (muting) or adding some white (softening).

Teachers are of course familiar with using certain colors to represent specific occasions or ideas—yellow for sunlight, white for purity, orange and black for Halloween, yellow and violet for Easter, and red and green for Christmas. These colors have familiar associations for children and adults alike.

Some colors—reds, oranges, and yellows—are cheerful, warm, conspicuous. They are normally associated with fire, danger, excitement. The so-called cool colors, on the other hand—green, blue, and purple—are more soothing and restful. They are commonly used to represent grass, water, and sky.

Color studies made at the University of Minnesota show that blue, green, and red in that order are the most preferred; orange, red, and blue have the greatest attention value; and yellow, green, and orange have the greatest luminosity or brightness.[14]

Lettering likewise calls for color "know-how." In an exhibits manual for extension workers based on Tinker's studies, Gilbertson says: "Whether measured in terms of speed of reading or distance that words

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[13] *Exhibition Techniques,* p. 19.

[14] Miles A. Tinker, "The Effect of Color on Visual Appreciation and Perception," *Genetic Psychology Monographs,* February, 1932.

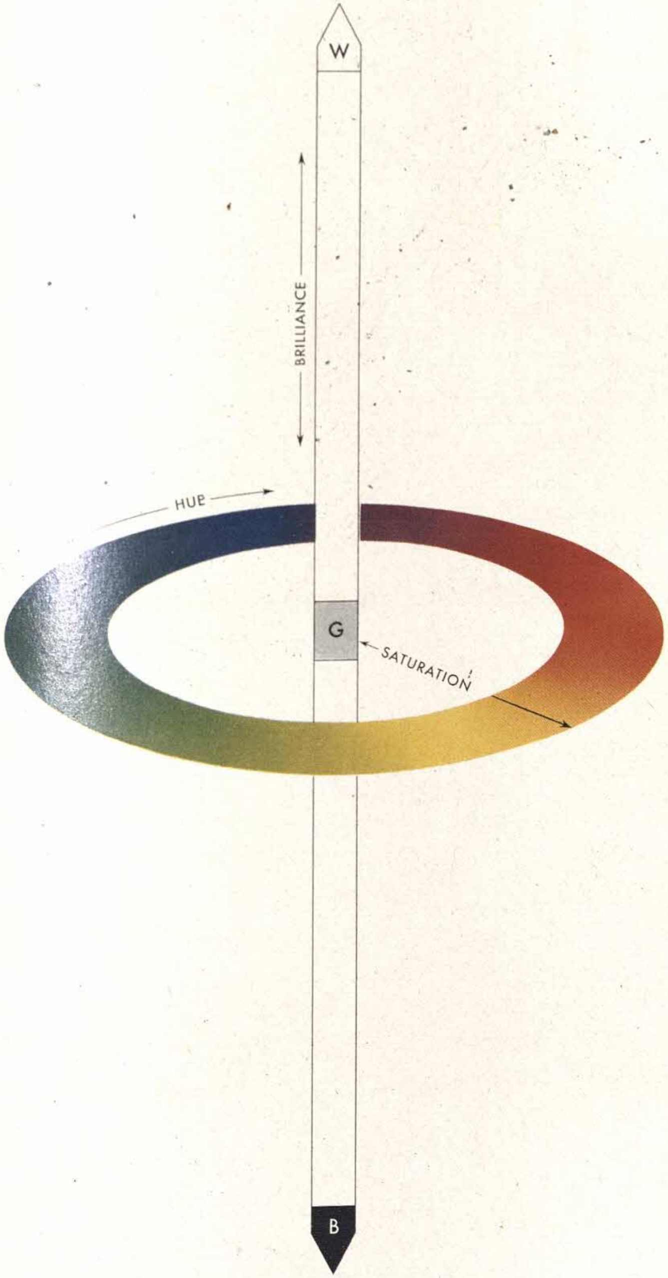

Fig. 8.21. The color wheel is convenient for checking color combinations. (From Gardner Murphy, *An Introduction to Psychology,* Harper & Brothers.)

can be read, the most important factor is the contrast in brightness between color of printed letters and background. The color combinations that can be read most easily at the greatest distance are listed in order as follows: Dark blue on white background, black on yellow, green on white, black on white, green on red, red on yellow, and red on white."[15]

Lettering for displays and exhibits in schools can be done in several ways. Hand lettering put in by capable students or teachers is distinctive and particularly desirable for large headings. Cutout plywood letters made in the manual arts shop are excellent. Three-dimensional letters made of cardboard and plaster are highly effective; they can be purchased commercially. Gummed letters in various sizes and colors are available at low cost. (Sources of these and other exhibit materials are listed on pages 535–536.)

Lighting is a dominant factor in any exhibit or display. It serves not only to focus attention but to bring out the effects that are created with design and color (Fig. 8.22). Artificial light is often better than daylight because the latter varies and is unpredictable. Furthermore, very strong daylight tends to reduce contrast and thereby weakens the character of a display. A professional exhibitor brings out the point in this way: "The advantages of artificial light are quite simply illustrated by comparing the daylight appearance of a well appointed shop window with the much brighter impression it creates at night. The importance of this concentration of light is very great where the task is to draw and hold attention."[16]

The use of expensive and intricate lighting for school exhibits is neither practical nor necessary. The fixtures in the average school that has an auditorium stage can be used to advantage for special occasions. A few spotlights and a floodlight or two will do much to add interest to an exhibit that extends around a gymnasium. When exhibit cases are located in corridors, a fluorescent fixture concealed in the case increases the attention-focusing power of the materials displayed. If you want to experiment, you can get pleasing effects by using colored gelatin sheets over the light. Since fluorescent light is "cold" light, no danger of fire is involved.

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[15] H. W. Gilbertson, in *Educational Exhibits—How to Prepare and Use Them,* U.S. Department of Agriculture, Miscellaneous Publication No. 634, Government Printing Office, Washington, 1948, p. 19.

[16] *Exhibition Techniques,* p. 68.

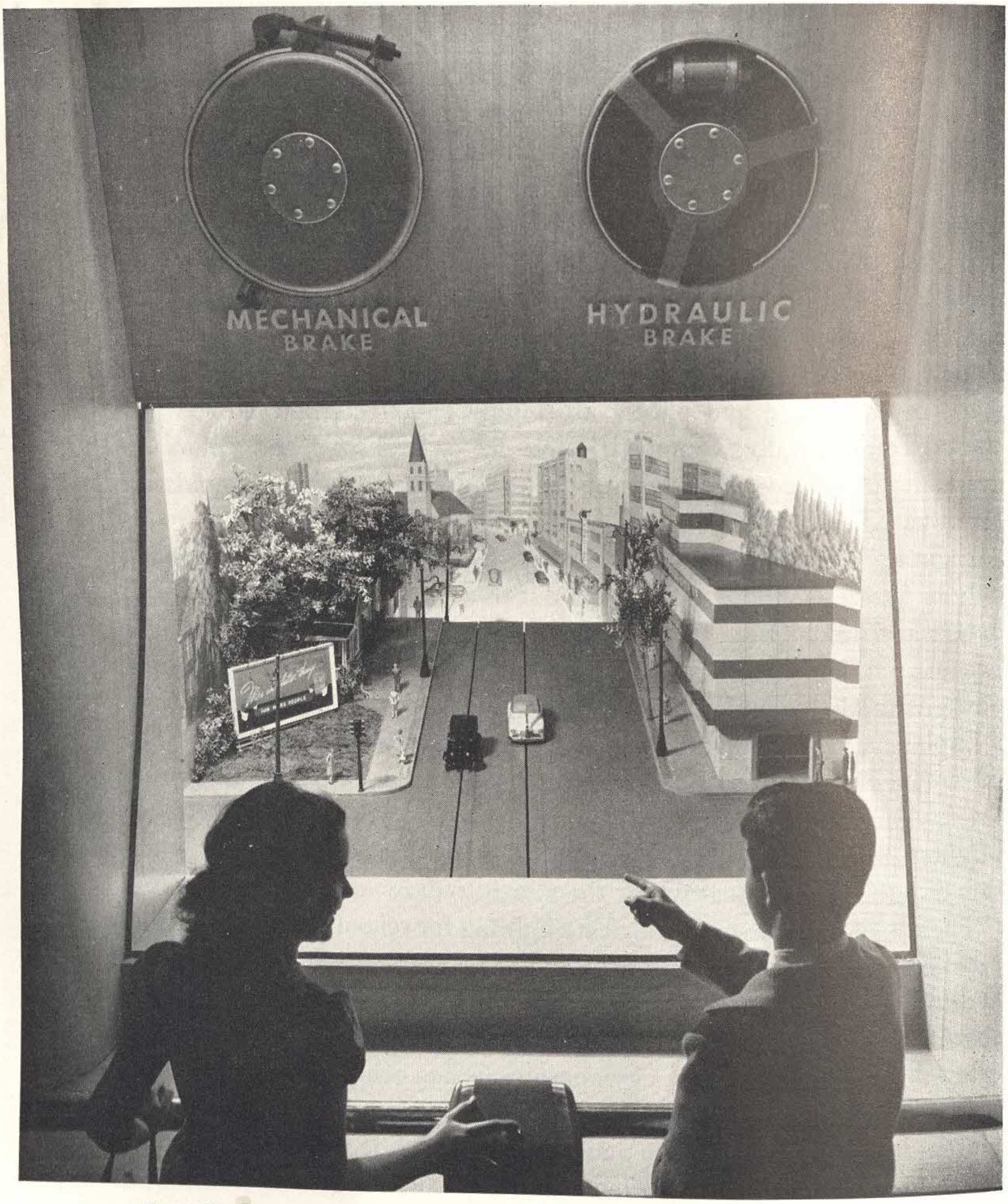

Fig. 8.22. Lighting, movement, and observer participation are important elements in this exhibit. (Museum of Science and Industry Photograph.)

Bulletin boards located on inside corridors or in dark corners of classrooms need lighting to be effective. A shaded fluorescent fixture at the top of such a board is a good way of lighting the display surface evenly.

Teachers who have been unable to get enough bulletin board space, to

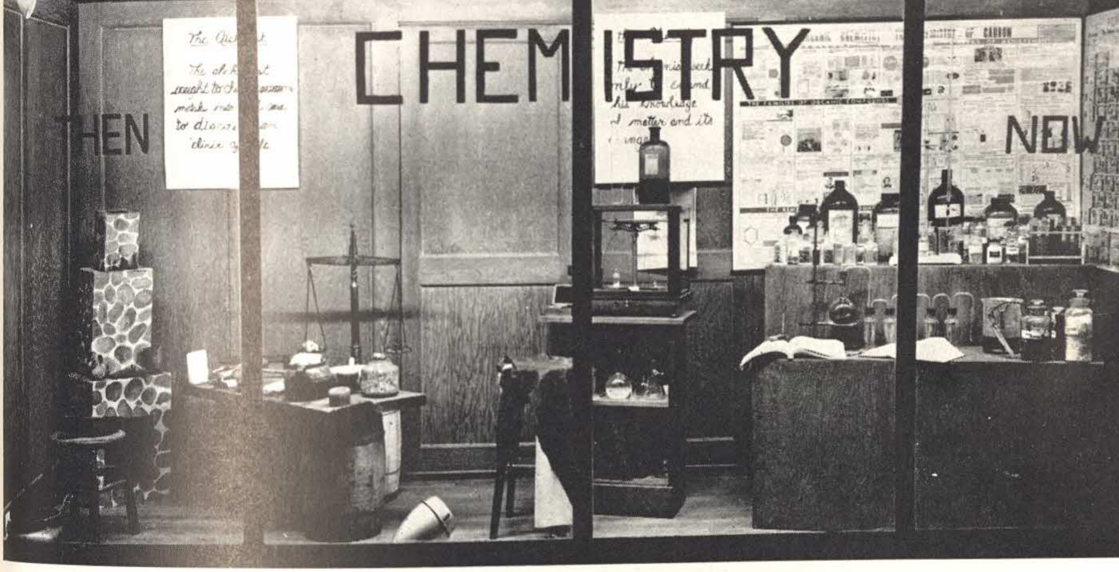

Fig. 8.23. Most school subjects have rich potentialities for worth-while exhibits. (Photo by H. W. Schulze, La Porte, Indiana, Public Schools.)

say nothing of lighting fixtures, may throw up their hands at this point. The writers have seen numerous installations of the above types in schools, and they believe that such improvements are not only possible but probable provided the request for them is stated in terms of sound educational values. After all, it was only a few short years ago that the idea of a radio in classrooms was regarded as visionary.

3. *Carry out your plans.* Planning is the key to a good exhibit or display. It takes time but is well worth it. When you put your plan into effect you can proceed with assurance and a minimum of waste motion.

Your students should work with you on the planning from the beginning in most instances; with a little help here and there they can carry much of the load. Helping to put on an exhibit offers another good opportunity for valuable learning above and beyond significant gains in factual information. The students who help with the exhibit will gain more than those who later simply see and enjoy it. The greatest profit for all, however, is derived from an exhibit which is planned and executed in terms of sound and effective educational principles.

SUMMARY

Much of the effectiveness of direct concrete experience in learning comes from the fact that such experience involves a well-rounded use of the physical senses. Although first-hand experience is impossible or impractical in many teaching situations, important segments of reality can frequently be brought into the classroom by means of models, objects, specimens, mock-ups, and dioramas.

These three-dimensional materials can help to make the learning situation more real, lifelike, and interesting to the student. Furthermore, they are frequently an improvement on reality itself. A model of the solar system or a one-celled animal, for example, reduces the vastness of the former and enlarges the microscopic proportions of the latter to a size which can be seen and studied. Cutaway models provide interior views of objects which ordinarily cannot be observed. Among their other useful characteristics, models have the realism of three-dimensions, they are usually simplified, important features are made to stand out clearly, and many have removable parts.

Models are defined as recognizable three-dimensional representations of real things; objects are the actual things. Specimens are objects or parts of objects that are typical of a class or group of objects. A mock-up is similar to a model but is distinguished by rearrangement and condensation of essential elements so that they can be studied more readily. Frequently a mock-up has little resemblance to the thing it represents. A diorama is a three-dimensional scene made with miniature objects and backgrounds.

In order to use three-dimensional teaching materials effectively, it is of primary importance that they be seen clearly and examined from various angles. Students should accordingly be permitted to handle and work directly with them whenever possible. The instructor must be careful to avoid giving the class distorted size concepts when models are used. As in all effective teaching, he should integrate pertinent materials in terms of lesson needs. In general, three-dimensional materials should be stored out of sight when not being used for actual instruction.

Displays and exhibits are other highly effective means of using three-dimensional materials. Although good educational exhibits require careful planning and the application of artistic principles governing arrangement, color, and lighting, they can and should be coöperative projects on which the students participate actively. Here too, as in the construction of dioramas and the use of other three-dimensional materials, valuable concomitant learning can take place in addition to the information gained concerning the particular subject.

Suggested Activities

1. Analyze a course of study in your teaching field and prepare a list of appropriate models, mock-ups, dioramas, objects, and specimens for use in it.
2. Have a committee prepare a list of sources of three-dimensional materials which are supplied free or on loan to schools. Ask your teachers for suggestions and check such sources as the Educators Guide to Free Materials and local libraries and museums. Organize the list in terms of subject areas and grade levels and have it duplicated for distribution to the class.
3. Inspect a number of effective window displays in your community and analyze them in terms of arrangement, use of color, and lighting. Take pictures if possible, and make simple sketches of the layout plans. Show these by means of an opaque projector when reporting to the class.
4. Prepare a report on the display and exhibit facilities of a school building. Include tackboards and exhibit cases in the halls and classrooms. Evaluate your findings and make recommendations for practical improvements.
5. Divide the class into committees and have each committee plan an exhibit for future use in the school. Among the possible subjects are National Education Week, civil defense, conservation, gardening, seasonal sports, hobbies, educational or vocational guidance, and units of school subjects.
6. Storing three-dimensional teaching materials is a constant problem in many schools. Visit several schools in your community and gather information on how this problem is handled. On the basis of your findings, list practical suggestions for solutions of it.

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9. Community Study

The children in the tenth grade were hard at work studying the subject of local government.

The teacher asked, "How many of you have ever attended a meeting of the common council?"

Not one hand went up.

The teacher tried again: "How many of you have visited the central water-pumping station?"

A few hands were raised. Most of the children admitted having been curious about the place, but they just hadn't got around to visiting it.

Within the past three years, however, this same group of thirty-six young people had "studied" the relation of the earth to the solar system. They had traced the story of mankind from the dawn of history to the present. They had "read" about the "type" countries of the world. They could give interesting and unusual bits of information about the Watussi and Mangbetu tribes.

These children were spending hours studying about people and things that were thousands of miles away. This is desirable, but it is also desirable that the school curriculum of today no longer ignore studying the local environment.

This is not a new situation.

A parent was examining a classroom display of community vocational opportunities. A student representative approached, gave him a brief explanation, and then concluded: "But you must know all about it."

"As a matter of fact," answered the parent, "I don't. I have gone by the walls of that place for over twenty-two years—going to and from my office. I often meant to stop in. I never have. I never have."

As we contemplate the many sources of information that are open to investigation, we must no longer overlook those which lie within "walking distance."

The local factory, retail store, business office, and packing plant are *real*. School children can *see* them, *hear* them, ask questions about them, and examine them minutely.

If we believe that first-hand experiences with real things are primary sources of learning, we must arrange to *investigate systematically the resources of local communities as part of the organized school curriculum.*

THE LEARNER MEETS HIS COMMUNITY

Faraway things and places, remote and inaccessible, are often greater challenges to the learner than things in his immediate vicinity.

This fact is illustrated in a carefully worked-out and beautifully photographed film, *Near Home* (Sound, B&W, 20 min., British Information Services). The following conversation takes place between the teacher, Mr. Richards, and his students, aged 11 to 15, as they pause on a hill overlooking Bishop Auckland, the town in which they all live:

JOHN. George says Bishop Auckland is a dull place. It isn't, is it?

TEACHER. Well, I wouldn't call any place dull so long as there is something happening there.

GEORGE. But there isn't anything happening.

STELLA. Why there's the market.

JOHN. And the castle. Lots of places haven't got a castle.

GEORGE. But it's only the Bishop's castle.

TEACHER. Do any of you others feel like George that you can't find anything interesting in Bishop?

RONNIE. My father says there is a Roman road in the town, but I have never seen it.

MARGARET. But that's Newgate's Street, isn't it, Mr. Richards?

TEACHER. Supposed to be, yes. It used to run right up over Brusselton Hill, just about where we are now, in fact, and then straight on to the north.

SHEILA. Was the town there then?

TEACHER. No, the town didn't even start to look like it does now for hundreds of years.

RONNIE. What were the Romans doing here?

BETTY. Well, when was the town built?

JOHN. Will you tell us about it, sir?

TEACHER. You ought to be able to tell me all about it. After all, you've always lived here. I haven't been here a year yet.

JOHN. But you know all sorts of things.

TEACHER. Maybe I do, but not all that many. I am as ignorant about the town as you are. I think we ought to do something about it.

JOHN. You mean read books about it, sir?

TEACHER. Read books, yes, but even more than that. We should look at things for ourselves, talk to people, ask questions.

ALLAN. Could I go down a coal mine?

TEACHER. Why not?

JOHN. But how will we start? What do we have to find out first?

TEACHER. There are all sorts of ways to start. Now there are rather a lot of you, more than I could deal with separately. Suppose we try to work in groups. Each group could do a different study.

JEAN. What's a study?

TEACHER. Well, Allan wants to go down a coal mine. All right, why doesn't the group that Allan's with find out as much as they can about the mines of the district?

In many cases the situation just described is the outgrowth of inertias which are inherent in our teaching procedures, because teachers readily accept the orderly, systematic curriculum plans handed to them by a higher authority, and in classroom work and study they depend too completely on easily accessible materials for learning—books.

Although books represent the accumulation of man's knowledge about things past and present, they are seldom entirely understandable to all the children. Why should the words the author uses to describe experiences he has had be interpreted similarly by students who may never have had those or even similar experiences? Teachers must not assume that the author's "experience-word" descriptions will recall similar "word-experience" patterns in the learner's mind.

MEANING AND SCOPE OF COMMUNITY STUDY

COMMUNITY STUDY DEFINED

Community study describes learning situations through which learners come into their first contact with and awareness of their immediate en-

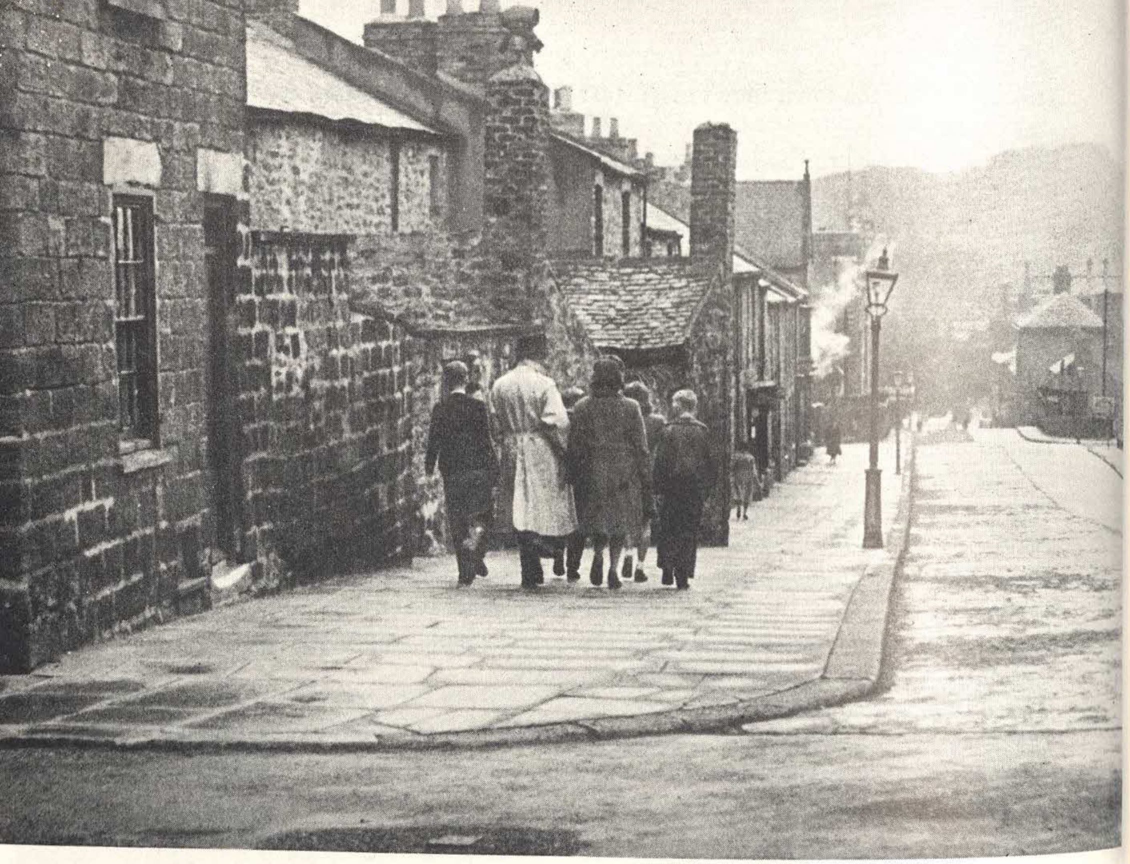

Fig. 9.1. (Figs. 9.1–9.4 courtesy of British Information Services.)

vironment. It usually calls for planned visits in the community (Fig. 9.1), or it may involve bringing to the classroom models, specimens, or people representing community activities.

Through community study the community itself becomes the classroom. The "walls of the school" expand. Pupils learn by doing, by questioning and observing. The best way to learn about casting molten iron is to watch it being done (Fig. 9.2).

Community study makes seeing and hearing realistic and exciting avenues for learning. But time must be provided for reflective thinking, planning the next steps, and further study (Fig. 9.3). Finally, community study experiences may become the basis of individual contributions to group projects. The relief model in Fig. 9.4 will be a record of the class's knowledge and accomplishment.

The literature on community study describes variations which have as

Fig. 9.2.

wide range as the accounts that are given about them. Community study reports include national caravan tours, youth hostel excursions, and world tours which, as their descriptions reveal, are only casually associated with the school's total program of planned educational experiences that should be available to all the children. Other reports describe community study as it is presented here, as the *formally designated part of the school program which extends the classroom into the community in order to give all the children increased experience with real things*—real things which relate to the curriculum plan.

The names used for community study vary as widely as do the descriptions of it. Most frequently used are school journey, excursion, field trip, tour, school visit, etc. In this chapter community study will be presented in terms of the school-authorized, teacher-planned, curriculum-integrated "field trip" during which things, services, and processes in the community

Fig. 9.3.

that are related to curriculum plans are studied by pupils under teacher supervision.

SCOPE OF COMMUNITY STUDY

One of the great inconsistencies of our educational planning is the fact that a child, on reaching the age of six, is placed in an environment which often restricts his natural inclinations. This child has spent the first five years of his life wiggling, crawling, manipulating, investigating, and exploring endlessly. Suddenly he finds himself "in school," restricted to the confines of a chair or desk. This situation is one of the anachronisms of educational planning.

To expect the six-year-old to conform to the restricted environment of a classroom for five hours a day, five days a week, is to run counter to all we know about his mental, emotional, and physical make-up. This child

Fig. 9.4.

should be allowed to pry into every corner of his environment as he participates in carefully planned, school-controlled community study experiences. Instead of being confined to the four walls of a classroom, he should be "free" to investigate his "world": the school yard, his friends' homes, the business district, and the open country outside the area he lives in.

The "schoolroom" for this child should include the caterpillars in the school shrubbery, and the small stream with its myriad wonders—water plants, the wriggling insects and pupae, tiny fish, and the sparkling crystalline rocks and stones on the stream bed. The school day should include "talks" and "visits" with community helpers—the mailman, the fireman, the policeman, and the people who are engaged in laundering, dairying, breadmaking, poultry raising. These "near-at-home activities" with which the child comes into such constant contact as he eats, dresses himself, keeps himself clean, and responds to his parents, teachers, neighbors, and other children his own age are subjects for community study.

As the curriculum becomes more remote, local evidences of faraway places may be subjects for first-hand examination. For the child who is studying the cultural patterns of far-off lands, what better way is there to begin community study than as one fourth-grade social studies teacher does—in the trailer factory?

There the children examine a trailer chassis. At first glance, a trailer is a massive thing with bright-colored paint and new black tires. But more detailed investigation reveals that this great piece of mechanized equipment is not a single thing, a trailer; rather it is the sum of many parts. Its panels contain tin from the Malay Peninsula. The fabric of its tires is made of jute and hemp from the Philippines. The rubber itself may come from South America, Indonesia, or India. The molybdenum of the hardened steel bearings comes from the mountain regions of inner China. The paint ceases to be solely color but is seen to be a combination of tung oil from the Orient and iron oxide from the Mesabi Range. The tough stout oak in the frame and cab opens the way for questions about white oak lumbering in the Middle West. Five-ply light pine panels represent the lumber industry in the forests of upper Washington.

As this teacher said, "Our community study opens vistas which demand the investigation of the world itself."

In the upper grades various subjects—mathematics, chemistry, physics, and English—may be motivated and made increasingly real by local study arrangements. Thus youthful chemists are taken to the air-reduction plant and to the coal-tar industries in the nearest industrial center.

Young mathematicians, pondering the utility of the formulas and geometrical relationships they are studying, need to examine leaf structure, the triangular prismlike form of a conifer needle; the intricate maze of angles, supporting beams, and other members of a railroad trestle; and the form and reasons for setbacks in architecture.

The student of English or communication finds substance for themes in every investigation he makes. He can use this information later in class discussions, in writing advertising copy, or in creating a radio newscast.

The idea of community study is not new. Among the first modern educators ordinarily acknowledged as presenting logical arguments for local study were Pestalozzi, Herbart, and Froebel. They reiterated their views on learning again and again: *Learning experiences which are real, life-like, and available to the learner for first-hand scrutiny, questioning, and recognition are likely to be the most effective avenues through which children become informed about their social and natural environment.*

As we contemplate the materials of instruction which are available, we should no longer overlook opportunities for local study. This study should begin with the worth-while experiences that lie within the very community through which young learners travel on their way to school. Equipped with this foundation of understanding, the child can then travel farther afield to experience and understand ever-widening expanses of his environment.

The immediate community often provides extremely dynamic, interesting, real-life opportunities for learning. It is the responsibility of the administrator and teacher alike to investigate the community, particularly those resources which seem to identify themselves with a more clear-cut and fuller understanding of formal school experiences.

PLANNING COMMUNITY STUDY

Frequently the key to making community study a going part of the local classroom activity is in the hands of the administrator. Teachers, not sure of the administrator's reaction to the proposal that the classroom walls be extended to include the community, often avoid community study opportunities.

The board of education of a midwestern city saw fit to encourage community study in its schools by adopting the following resolution: "In order to provide the most effective teaching environment, field trips and excursions outside the classrooms and school buildings and grounds under the supervision of members of the school staff are considered by the Board of Education as an extension of the classroom and an integral part of the educational program."[1]

In the bulletin giving his interpretation of this resolution the superintendent said, "The purpose of this resolution is to remove any possible doubt regarding the fact that local study is a legitimate part of the educational program and will be recognized as such by the administration and the Board of Education. In the case of injury to a child, it protects the teacher from any charge that the trip was not in the line of duty and was not a part of the regular school program."[2]

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[1] *Bulletin* 89, Madison (Wis.) Public Schools, June 9, 1943.

The impetus such a statement gives to a community study program is obvious. Bonded transportation facilities provided by the school bus line or by a local transportation company remove other possible barriers to the execution of such a program. The limits of the environment that can be explored by the children are as broad as the school day itself, which may range from 9:00 A.M. to 4:00 P.M. Good roads, modern transportation, and careful planning can enlarge the school's study and learning environment to a radius of as much as 100 miles, with the school as the center of the circle.

SURVEYING COMMUNITY RESOURCES

A systematic search of local study opportunities as they relate to units of work in the general curriculum may well be the basis for school-wide teacher-planning activity. Such a project was recently discussed during faculty meetings in an elementary school. The teachers were enthusiastic about the possibilities and a search of the community began immediately.

Not much time elapsed before a third-grade teacher reported to the principal that when she suggested that her pupils visit a dairy during their study of truck and dairy farms, the children told her that they had already been to one. Investigation revealed that they were right. Not only had they been taken to one of the local dairies, but they had visited the same dairy in the kindergarten, in the first grade, and again during the second grade. This led the teaching staff to decide to conduct a status survey on existing local study practices.[3]

The teachers of the six grades asked each of their pupils what community study experiences they could recall. The first step in the study was to tabulate the frequency of these pupil-recalled experiences. This revealed that in many cases a given community situation had been visited by school children at every level, kindergarten through sixth grade. Again the most notable case of duplication was the visits to a local dairy. The dairy in question not only was willing to supply transportation to any teacher-pupil group but at the end of the "study visit" distributed generous samples of ice cream, chocolate milk, etc. A similar situation was revealed in regard to the neighborhood bakery and a candy store. Needless to say, many purposes other than purely educational were behind the repetitious visits to these three community resources.

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[2] *Ibid.*

[3] Taken from one of the authors' experiences as an elementary-school principal and supervisor of curriculum in the Madison (Wis.) public schools.

The teaching staff decided to do two things: (1) to survey community opportunities for study, and (2) to examine community study situations in terms of the degree to which the content of the various work units could be studied and enriched through selected local study opportunities.

A young child may gain one type of experience in a given community study situation. But this same child, two or three years later, may investigate the identical study situation from an entirely different point of view and in search of a new set of outcomes. Accordingly the teaching staff recognized that visits to some local study situations might be repeated if circumstances seem to warrant it.

One year later, as a result of this teacher-inspired investigation of community resources and their relationship to units of study in the elementary grades, the following list was drawn up. In each case selected local study situations are paired with the units of study to which they relate. No local study situations were assigned to more than two grade levels.

LOCAL STUDY SITUATION	UNIT OF STUDY
Grade 1	
Animal hospital	Pets
Arboretum	Spring Changes
Chicken hatchery	Pets
Seed Store	Gardens
Toy shop	Toys
Grade 2	
Bakery	Bakery
Dairy farm	Dairy
Fire station	Fire Department
Flower shop	Flower Shop
Fruit and vegetable market	Grocery
Greenhouse	Flower Shop
Grocery	Grocery
Post office	Post Office
Zoo	Parks—Zoo

Local Study Situation	Unit of Study
Grade 3	
Cheese factory	Farm—Truck and Dairy
Lumber company	Tree Friends
Neon light shop	Light
Truck farm	Farm—Truck and Dairy
Grade 4	
Apiary	Insects
Arboretum	Trees of Our State
Biology building exhibits	Bird Friends Insects Wild Flowers and Plants
Game and Fur Farm (Poynette)	Animals of Our Fields and Woods
Grade 5	
Airport	Transportation
Bus barns	Transportation
Fish hatchery	Fish
Forest Products Laboratory	Forests of the United States
Historical museum	Transportation Changes in Schools
Post office	Communication
Quarry	Rocks and Soil
Radio station	Communication
Railway station	Transportation
Streamliner train	Transportation
Telegraph office	Communication
Telephone company	Communication
Waterworks	Water
Weather bureau	Weather
Zoo	Wild Animals of Our Country
Grade 6	
Bookbindery	Story of Books and Records
Canning company	Industry Through the Ages
Capitol	Story of Government
Coca Cola company	Industry Through the Ages
Condensery	Industry Through the Ages
Courthouse	Story of Government Architecture Through the Ages

Local Study Situation	Unit of Study
Factory—Scanlon-Morris	Industry Through the Ages
U. W. Geology Museum	Prehistoric Animals Plants Through the Ages
Historical library	Story of Books and Records
Newspaper office	Story of Books and Records
U. W. Observatory	Stars and Constellations Solar System
Packing plant	Industry Through the Ages
University of Wisconsin and Capitol Square	Architecture Through the Ages
Voting center	Story of Government

A coöperative study[4] of field trip opportunities in Dearborn, Michigan, reflects what the combined efforts of many interested teachers can accomplish. The teachers in that community pooled their field trip plans. If a field trip was judged to be successful as a learning experience, essential information about it was reported.

Summaries of these reports were made available to all the other teachers. The following is a typical summary report of a field trip to a meat-packing plant:[5]

Place: Detroit Meat Packing Company.
Address: 1120 Springwells, Detroit.
Person to contact: William Hill. *Telephone* Vi. 2-3500.
Objective: To see how livestock is slaughtered and the meat made ready for the market.
Things to see and do: Class will be shown cattle, hogs and sheep being herded into yards. They come by truck and railroad cars. You will see cattle, hogs and sheep as they are slaughtered, dressed and placed in coolers. All refuse is saved and made into by-products. Group will be shown how meat is cut into halves and quarters, how certain parts are made into cold meats, lard, etc.
Teaching aids: Film *The Cattleman.*
Observations en route: The Ford Motor Company.
Age of pupils permitted: 15 years and up.
Suitable for grades: Ten, eleven, and twelve.
Number of pupils: Not over 15.
Days and hours to visit: Tuesday and Friday. Make arrangements about five days in advance.

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[4] William G. Hart, "Field Trip Handbook," *See and Hear,* January, 1951, p. 20.

[5] Marshall Becher, *Field Trip Handbook,* Dept. of Audio-Visual Instruction, Dearborn Public Schools, p. 156.

Traveling time one way: 20 minutes.

Directions to get there: Take Schaefer Road to Dix, turn left on Dix to Springwells, right to 1120 Springwells.

Parking accommodations: Ample in plant parking lot.

Guide service: Guide will be assigned by Mr. Hill.

Admission fee: None.

Remarks: Tuesday and Friday are best days to visit. Activities vary from week to week. Hence arrangements are more liable to function if date is confirmed four or five days in advance.

Local study opportunities vary from community to community. The opportunities which the teacher in an open rural area has are only slightly related to those of a teacher in a crowded metropolitan center. However, it is just as desirable for the rural group to have study experiences in a metropolitan area as for the children who go to school on crowded city streets to experience being in the open country.

Community study opportunities are available to every school and should be explored.

TEACHER LEADERSHIP IN COMMUNITY STUDY

Following the examination of community resources and the correlation of local study opportunities with specific units of study, each teacher is confronted with certain responsibilities that must be met during community study situations. The following are typical:

1. Preliminary preparation.
2. Preliminary discussion of study objectives.
3. Observation.
4. Follow-up discussion and evaluation.
5. Follow-up projects growing out of community study.

To illustrate these responsibilities, we shall assume that the teacher and his pupils are to visit and study the local airport.

PRELIMINARY PREPARATION

Usually the teacher visits the airport beforehand. If after this preview he believes that the airport can provide a valuable learning experience for the class, he proceeds with further planning.

As much responsibility as possible should be given the children. In terms of their age and level of maturity they can assume certain responsibilities, such as the following:

1. The children should write, telephone, or interview the person in authority at the airport to arrange for the time of the visit. Definite arrangements regarding time and place of arrival and length of visit should always be made well in advance of the trip.
2. The children should write letters to their parents and the principal telling of their plans, route, purposes, etc., in connection with the trip. Both parents and administrator should be notified that the children are leaving the school building.

The teacher should decide concerning the safest route. If transportation is needed, the school bus should be used. However, if private passenger cars are used, they should be adequately covered by passenger liability insurance. Whenever possible, bonded carriers—usually buses—should be engaged. They should be told exactly when to pick up the children at the school and should discharge them in a designated safety zone at the airport.

PRELIMINARY DISCUSSION OF STUDY OBJECTIVES

As in beginning any new unit of study, preliminary discussion of a proposed community study will assist the children in developing definite purposes and will arouse their curiosity and interest in the experiences, understandings, and factual information they will be able to acquire. Such discussion will give them an opportunity to discuss information they already have. It will also reveal inaccurate or purely imaginary concepts and ideas about the local study situation.

On the basis of what the children already know and of what it is hoped they will learn, teacher and pupils should plan what they hope to achieve as the result of their experiences at the airport. Their objectives may include:

1. To learn how weather information is used by the airplane pilot.
2. To find out about the cost of passenger travel, the distance to given destinations, and the time required to reach them.
3. To learn more about the duties of the stewardess.
4. To find out how airmail and air express are handled.
5. To find out what makes an airplane stay in the air.

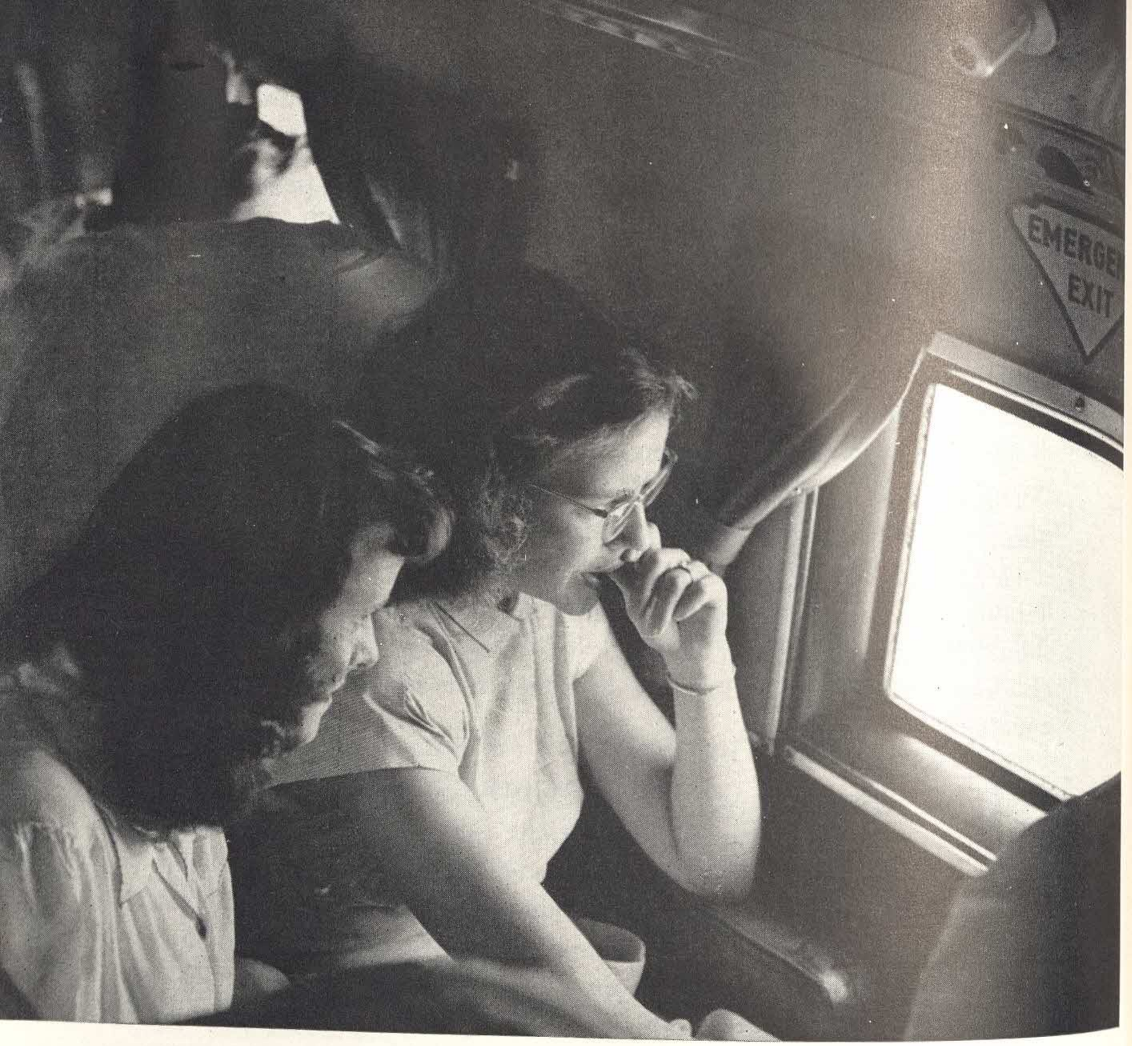

Fig. 9.5. The word "clouds" takes on many new meanings as these students fly through them and observe cloud formations from above. (Milwaukee Journal Photo.)

6. To find out about gasoline consumption, cost of operation, etc.
7. To learn how the airport serves the community.

More subtle purposes may have to be suggested by the teacher. Such purposes include seeing who can "unearth" the most unusual information, who can be the most courteous, the most completely responsible for his own good behavior, etc.

Every new area of study imposes a certain specific vocabulary responsibility. Hence the teacher will consider in advance any new or unusual vocabulary items that will influence the opportunity for more complete learning during the visit. In this case these terms may well include "ceileometer," "alto-cirrus," "cumulus," "anemometer," "beam," "c.v.u.," "teletype," "two-way radio," etc.

While these words may be high up on any formal word count list, the need the children feel to know them and the interest they show in attaching significance to them make them necessary new vocabulary items. Prestudy and discussion of terms that are inherent for complete learning in the situation will give the children increased opportunity for attaching meaning and understanding to their contemplated real experiences.

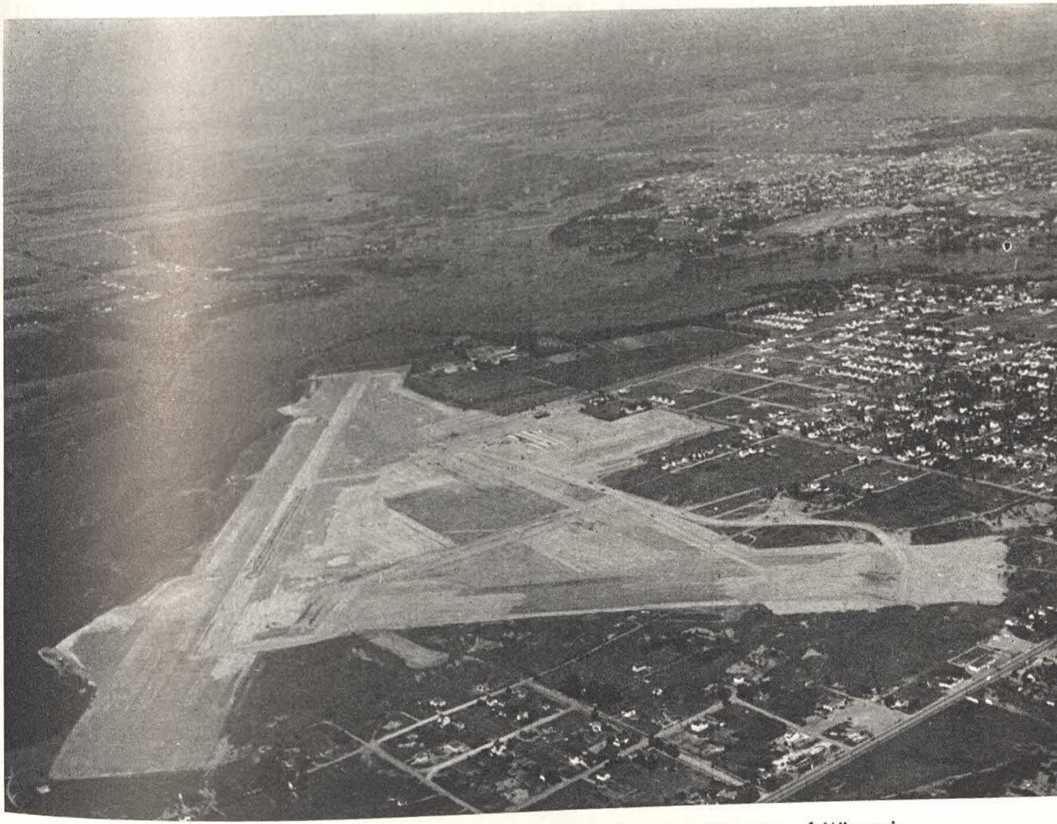

Fig. 9.6. This airport photograph provides a visual reference for discussion. (Courtesy of Wisconsin State Aeronautics Commission.)

The combination of anticipating learning problems and being given a clear-cut and definitive statement of the objectives to be achieved is the best preparation the learner can have in advance of the actual visit.

OBSERVATION

While the students are at the airport, they must be encouraged to be alert in finding answers to the questions they want answered. It is impossible to anticipate all the questions the children will have when they are at the airport. For this reason every child must realize that he is expected to ask questions and to investigate what he sees as he goes from weather station to control room. The teacher soon learns to anticipate a student's need for further explanations.

Note taking should be encouraged. When possible, take along a camera. Photograph complicated airport equipment and procedures so that these pictures, or slides made from them, may be examined and discussed in the classroom.

Once the student is back in the classroom, his impressions of a field trip may be marred by several things. Noise and confusion may have interfered with complete understanding. Other mechanical problems such as space or lighting may have blocked it. Haste due to the necessity of meeting time schedules may have made it possible to catch only a fleeting glimpse of an important operation or piece of equipment.

FOLLOW-UP DISCUSSION AND EVALUATION

After the trip, classroom discussion should be encouraged. This, of course, is one kind of evaluation technique. Other outcomes of the visit include written descriptive accounts, letters to friends describing experiences at the airport, news releases for the class or school newspaper, letters of appreciation to the airport personnel, graphic or pictorial records of aircraft, equipment, etc., and the construction of model hangars, aircraft, and beacons.

Objective tests of the completion or true-false type which are devised through teacher-pupil coöperation are very helpful in analyzing outcomes.

FOLLOW-UP PROJECTS

After their airport study experience, the pupils should be encouraged to apply their new information. Follow-up projects growing out of this study may include individual research in the form of reading or of interviewing persons associated with the aircraft industry—a member of the ground crew or of the weather bureau, a teletype operator, a ticket agent.

Children interested in model construction may correlate problems involving linear measure, angle construction, and mechanical drawing in a scale drawing and model of the airport. Those interested in science and electronics may wish to investigate directional beams and instrument landing systems.

As the result of other community study situations, it may be possible for student groups actually to participate in projects which benefit the community. One needs only to ride through the reforested sections of the North Central Plains states to see conservation projects that have resulted from field trips. Along the roadway are signs reading "School Forest." Such forests are plantings of young pine trees, usually the outgrowth of the study of conservation by school children.

Field trips in the community may create opportunities to participate in civic affairs. Several worth-while follow-up projects of this sort are shown in the film, *Learning Democracy Through School and Community.*[6] A field trip to the local common council might be followed by the revising of student government election campaign regulations. Visits to local industries lead logically to organizing a school and community vocational guidance plan, under which professional men and representatives of labor and industry come to the school on scheduled occasions to discuss their work and to advise the pupils about vocational opportunities and choice. Civic clean-up campaigns, the erection of safety signals at danger spots, and the provision of recreation centers, play areas, and hostel circuits are additional community study projects of the same nature.

Community study may become the basis for many intraschool activities such as discussion panels, mock radio broadcasts, displays of artwork, and exchange reports with the classroom across the hall. Its most significant outcome, however, is seen when students plan ways in which they as future citizens can participate *now* in making their community a better place in which to live.

EVALUATING COMMUNITY STUDY

As was said above, a visit in the community should be a carefully planned learning experience. Following it, the teacher should evaluate its success in terms of what was experienced by the children who participated. Such items as the following are objective measures of success or failure:

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[6] Sound, B&W, 16 mm., 20 min., Educational Films Service.

1. This visit or interview was arranged because it was closely related to planned curriculum objectives. Yes .... No ....
2. The experience was worth the time and effort required because it provided useful learning opportunities which could not have been presented by ordinary classroom methods. Yes .... No ....
3. The students themselves became responsible for:
   a. Knowing the purposes for which they undertook the community study. Yes .... No ....
   b. Formulating safe-conduct attitudes. Yes .... No ....
   c. Devising follow-up discussions and evaluation. Yes .... No ....
   d. Initiating follow-up activities. Yes .... No ....
4. The teacher was responsible for all local school regulations concerning community study visits or interviews by:
   a. Previsiting the place to be studied. Yes .... No ....
   b. Arranging time of departure, arrival, and return via school bus or other bonded carrier. Yes .... No ....
   c. Sending study announcements home with children. Yes .... No ....

SUMMARY

Study of the environment in which we live is often overlooked as part of formal classroom activity. This should not be.

A systematic analysis of the community in which the school is located will reveal many valuable opportunities for learning at first-hand. Surveying community study possibilities should be coöperative projects for teachers in locating local industries, distributive agencies, service organizations, etc., which reveal social processes and provide values important to implementing the school curriculum.

Because of its realism, community study can become an effective first step in building understanding through real experiences which can give subsequent and more abstract learning situations additional meaning and heighten understanding of them.

The purposes of community study are as follows:

1. To serve as an opportunity for real experiencing through which to gain valid understandings.
2. To arouse and create interest. Few learners fail to be motivated as they contemplate and examine things, processes, and ideas.

3. To create backgrounds of experience which later will give meaning to reading and simple research done in the more formal study situations of the school classroom and library.
4. To provide backgrounds of experience which later will stimulate students to participate in class discussion, creative art projects, and written communication (writing letters, themes, stories, poetry, etc.).
5. To encourage and develop keenness of observation and care in observation, and insatiable curiosity.
6. To encourage active participation in community planning. Students can plan the community projects that grow logically out of field trip experiences. Such projects serve as bridges which lead from school experiences to community membership.

These purposes are seldom achieved in the absence of careful teacher guidance.

The outcomes of community study are well summarized in the following discussion between Mr. Richards and Mr. D., a parent:

MR. D. Well, I'm greatly impressed by all this, Richards. The youngsters have done a remarkable piece of work.

RICHARDS. They enjoy it—it's all I can do to keep up with them.

MR. D. Now, what do you think your youngsters are going to get out of it? I should say you've given them something very valuable . . . what one might call a real objective view of the town in which they live. . . .

RICHARDS. Yes, I knew that was the side of it that would appeal to you! But don't run away with the idea that they understand all this thoroughly—we don't expect them to. But they've been getting a basis of first-hand information that will still be there when they can make use of it—and they're developing, too, a habit of wanting to know, of finding out for themselves. Instead of learning geography, history, science and so on, all in watertight compartments, they've been finding out how everything fits together . . . and learning a lot of other things, too . . . things that will influence their whole life, and more. . . .[7]

Suggested Activities

1. List as many community study situations as you can which relate to your subject field. Since, as you do this, you will need to know more about your community,

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[7] *Local Studies,* Ministry of Education Pamphlet No. 10, Prepared by the Central Office of Information, His Majesty's Stationery Office, London, 1948, pp. 81–82.

   - a. Consult the Chamber of Commerce.
   - b. Ask experienced teachers for help.
   - c. Study the local business directory.
   - d. Talk with lifetime residents of the community.
   - e. Interview the county agent and the editor of the local weekly or daily newspaper.
2. Visit some of the community resources which, after careful thought, seem to hold the greatest hope of enriching your subject area through the experience to be gained from seeing them. Take notes while you are there; gather data as is suggested on page 243.
3. Make a list of the people you met during your survey who are willing to come to your classroom to talk to and be questioned by your students.
4. Plan a visit, tour, or field trip into the community. As you proceed, keep a record. Devise your own record, or use the headings on page 250.

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Field Trip, Sound, Color, 11 min., Virginia State Dept. of Public Instruction.
Near Home, Sound, B&W, 27 min., British Information Services.

10. Classroom Use of Radio

Radio has created a nation of listeners. In the average American home one or more radios are in operation for at least five hours a day. Currently television programs are consuming some of the time previously devoted to radio, but this is transitory, for television today is not yet available universally. Although it is a glamorous and attention-arresting attraction in most centers of heavy population from coast to coast, for the present at least radio continues to be the more universal means of flashing news, entertaining, and educating via broadcasting.

Young listeners spend on the average over two hours a day before the loudspeaker—more time in leisure-time listening than in leisure-time reading.

As a source of information, radio ranks high. Seventy per cent of the families owning radios listen to news more or less regularly, and research findings indicate that the average news listening is the same on all levels of society. One survey indicated that radio was a primary source of information about current events for the majority of high school students.[1]

Radio arouses and holds the attention of listeners young and old. To be convinced of this, any teacher has only to slip out to the school playground and "listen in" on the spontaneous play and talk to young children. He will hear the vocabulary of the Lone Ranger, Hopalong Cassidy, the Green Hornet, and the Space Cadets. Children's toys reflect designs inspired by radio programs. Clothing for play and school is adorned with pictures of radio heroes. The same pictures appear on the breakfast food containers that are set before the children. We live in a world of plastic radio cases, microphones, loud-speakers, and radio personalities. Television of course has modified this (see Chapter 15).

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[1] Elizabeth Goudy Noel, "Good Listening," *See and Hear*, April, 1947, p. 32.

Interest in radio-learned ideas is high. Why not capture this interest and utilize it wisely in the classroom?

Classroom use of radio is a young but healthy phase of American education. Systematic use of radio in the classroom had its beginning in 1919. In that year, WHA,[2] the state-owned University of Wisconsin station, completed sufficient experimental work to begin scheduled informational broadcasts to schools and communities in that state. On the heels of this remarkable development in broadcasting over WHA and shortly afterward over its sister station WLBL, other regularly scheduled broadcasts were begun over KDKA, Pittsburgh (the origin of the Pittsburgh School of the Air); WWJ, Detroit, currently carrying educational programs in its service area; and KUOM, the University of Minnesota station. Between 1919 and 1922, radio broadcasting as a schoolroom source of socially useful information in science, social studies, art, music, home economics, language arts, etc., came into being.

Today, vast areas of the United States can tune in on state and regional networks. Typical of the development of FM are New York state's Empire School Broadcast Service, the Indiana State School of the Air, the Wisconsin School of the Air, the Minnesota School Broadcast Service, the Texas School of the Air, and, at the regional level, the Rocky Mountain Radio Council. City facilities include carefully worked-out, curriculum-coördinated radio programs in such places as Cleveland and Cincinnati, Los Angeles, St. Louis, New York City, Detroit, Chicago, Indianapolis, Omaha, Flint (Michigan), and a host of others.

Although the earlier broadcasts more specifically planned and produced for school by the National Broadcasting Company and the Columbia Broadcasting System have been discontinued as such, many programs in music, social studies and English, science and language arts that are valuable for schools are still broadcast as sustaining features.

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[2] WHA, "the oldest station in the nation," is a 5-kilowatt daytime-only station operated by the University of Wisconsin. In addition, the state broadcasting service includes a network of FM stations (six now in operation, two under construction) and another 5-kilowatt AM daytime-only station formerly operated by the State Department of Agriculture. WHA is administered by the University of Wisconsin through a faculty committee; the other stations are under the administration of the State Radio Council, whose members include the governor and nine administrative officers concerned with education on a state-wide basis.

Radio provides source material for the main stream of classroom work. In the words of George Watson, State Superintendent of Schools, Wisconsin State Department of Public Instruction: "Radio is not an addition to education. Radio is not something to be placed on top of education. Rather, radio *is* education."

Learning by listening to the radio is a naturally interesting activity. Records of the Wisconsin School of the Air show that carefully planned learning experiences in conservation, art, music, creative dramatics, and citizenship reach listeners in almost 4000 community and rural schools. More than 450,000 children listen and learn, then create and study in response to radio listening activities.

Radio does not do the teacher's work. Rather, it is a means through which the student can explore the world of things, ideas, and places. Radio opportunities are well described by Frederic Willis:

> I like to think of education by radio as a timely, vital, dramatic thing: a system of learning or acquiring more information, a means of widening one's horizons, or enriching one's life and breaking down prejudices, through inspiration and not perspiration; an education by desire and not by discipline; a pattern of swiftly changing pictures and events with keen interpretations, not statistics and formulas; a moving panorama of the world in which we live—right now, while we are living in it—not a dreary drill of textbooks and tests. In short, I feel that one of broadcasting's most helpful contributions to education and one of its real responsibilities to itself and its listeners is the popularizing of education itself.[3]

CHARACTERISTICS OF GOOD SCHOOL BROADCASTS

The modern school broadcast is a carefully planned audio-learning experience which utilizes resources beyond those available in the usual classroom situation. Because these broadcasts are usually prepared by excellent teachers and subject experts, school radio programs make possible outstanding and unusual learning experiences.

The radio writer, realizing that sound alone is the means through which radio-borne ideas are carried into the classroom, consults both teachers and subject experts regarding information which will lend itself to this means of communication.

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[3] Frederic Willis, *Widening Horizons*, National Advisory Council on Radio in Education, University of Chicago Press, Chicago, 1934, p. 3.

Let us examine the planning and creation of a science radio series recently completed for the St. Louis city schools. It was decided that a series of science radio programs should be produced for Grades 4, 5, and 6. Work was begun under the leadership of a consultant in science teaching for the elementary schools and of representatives of the division of audio-visual education.

Many conferences were held during which the curriculum objectives for the three grades were discussed. On the basis of these discussions it was decided that certain of the objectives could be achieved by means of an educational radio program. Among the specific objectives which the program should fulfill were the following:

1. Each program would require and encourage study on the part of the class before the radio broadcast itself was heard.
2. Each program would consist of carefully planned science experiments which would be performed simultaneously in the broadcasting studio and in the classroom by two or three student experimenters who would act for the class during the broadcast (Fig. 10.1).
3. The class would draw its own scientific conclusions during a utilization and discussion period *following* the broadcast (Fig. 10.2).
4. Programs would establish among the children a familiarity with commonly used laboratory equipment and techniques.
5. Programs would develop in the children open-mindedness and "see for yourself" attitudes that are exceedingly useful in living.

One of the initial programs involved understanding levers. In its preliminary stages, specific and important questions had to be answered—How long could the students' interest be held during a radio broadcast? Was 13½ minutes too long for each broadcast? How fast could directions be given over the air and still be meaningful to all the children? Could fourth- and fifth-graders be relied upon to handle simple equipment like boards, hammers, nails, screwdrivers? Would the experimenters be self-conscious or would they enter whole-heartedly into the classroom demonstration from which all the children would benefit? Would the class think some of the experiments were funny?

There was only one way to answer all these questions—to make tape-

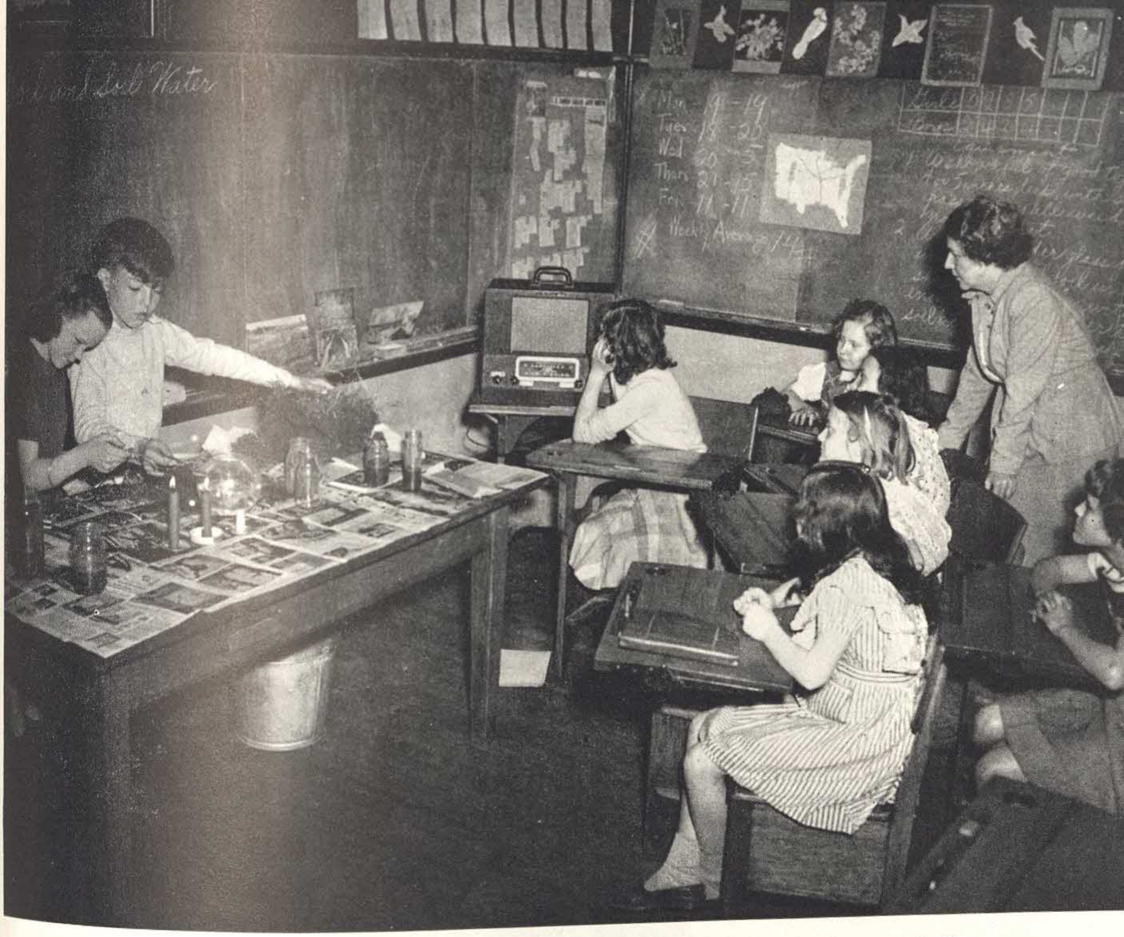

Fig. 10.1. As this science broadcast on soil and water proceeds, children in the classroom do the experiments that are being described over the radio. A successful lesson by radio encourages pupil participation. (This and Fig. 10.2 courtesy of St. Louis Board of Education.)

recorded experimental broadcasts and try them out. These tryouts showed that some of the equipment was too complicated and that some of the experiments did not work because the students could not control them as carefully as the studio participants could. It was sometimes necessary to remake a program three or four times before it was acceptable for use in the fourth, fifth, or sixth grade.

Finally a radio lesson handbook was prepared and distributed to each teacher. The handbook described each program, listed the materials that should be on hand when the broadcast began, listed reference or classroom reading materials, and described what the student experimenters would do during the broadcast.

Fig. 10.2. After the broadcast the children question and discuss, and even repeat the experiments if necessary. Pupil participation serves as an evaluation of the learning experience.

Because the broadcast itself was only one part of the entire classroom learning situation, other audio-visual aids which could be used were described by title and content and purpose. They included specimens, sound films, filmstrips, and books from the library that were to be in the classroom at the time of the broadcast. Directions for tackboard exhibits and chalkboard diagrams were also given. The broadcasts were transcribed so that they could be used in classrooms at other times that those called for by the regular broadcast schedule.[4]

This science series illustrates several advantageous characteristics of radio programs for classroom use:

1. Radio can bring carefully planned teaching experiences into any classroom that is equipped with a receiver.
2. Radio can bring outstanding demonstrators, teachers, and other experts into the classroom.
3. Radio is inherently interesting and challenges the attentive listening of learners.
4. A well-planned classroom radio lesson is in itself a valuable in-service training experience for the teacher who listens.
5. The classroom use of radio not only is a listening activity but on occasions invites the active participation of the listeners.

The classroom art broadcast entitled "Wilbur, the Sleepy Little Ghost" further illustrates this last point when it explains new techniques for using colored chalk and pastel crayons. One of the outstanding art teachers in Wisconsin was employed to produce the series.[5]

Bill. Today Wilbur, the Sleepy Little Ghost, is going to give you your picture ideas and you're going to learn how to use colored chalk.

Myron. Bill, what should the boys and girls do who don't have colored chalk to work with?

Bill. Well, I hope you all do have chalk, but if you don't, just use your old friends, your crayons or your watercolors. And no matter which you have, you'll want to listen to the art instructions and learn how to use colored chalk. Colored chalk can work wonders if you know how to apply it. If you don't, it can get you into more trouble than even Wilbur, the ghost, gets into.

Myron. Wait a minute. That all sounds wonderful. What are these troubles we're apt to get into?

Bill. Well, chalk can be very, very messy. It can rub off your picture. It can float through the air into your hair and your nose, onto your shoes, and your clothes . . . and dirty everything in sight.

Myron. Looks like we could have as much color on us as on our pictures!

Bill. You could . . . if you're not careful. If you have newspapers handy,

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[4] Adapted from Catherine Dillon, "The Museum with a Voice," *Childhood Education*, March, 1950, pp. 316 ff.

[5] Wisconsin School of the Air, *Let's Draw*, No. 6—Series 13, October 26, 1948.

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cover your desk with them. That's one way to save messing up your classroom.

MYRON. A good idea, too. Now, how do we use our chalk?

BILL. Look at the top of page 14 in the teacher's manual . . . you'll find lots of ways suggested there. And I hope you saw page 18 of the manual which suggested that you do some experimenting before the broadcast.

MYRON. I'm sure most of the boys and girls have experimented with their chalks. But I think we could use a little review.

With the completion of that part of the broadcast, which encourages participation by pupils and teacher, the story of Wilbur begins.

Wilbur, the sleepy little ghost, was just that. Sleepy—always going to sleep. In fact, he was so tired that even during his classes in the first grade, when he should have been learning moaning and groaning, appearing and disappearing—well, he just couldn't stay awake. He was in danger of failing to pass.

It happened, however, that Wilbur was given the task of scaring away an annoying giant; and to help Wilbur stay awake, his friends hit upon the idea of providing him with an alarm clock:

BILL. An alarm clock! It was just the thing. Wilbur set it carefully to ring at exactly twelve o'clock. It was now just ten minutes to twelve. Then he hurried down to Main Street to meet the Giant. He smoothed the wrinkles out of his sheet, sat down on the top of a telephone pole to wait, and promptly fell sound asleep. But this time it didn't matter.

MUSIC: TRAMP TRAMP OF GIANT UNDER

BILL. When the giant arrived at noon, and the clock struck twelve, off went the alarm.

SOUND: ALARM CLOCK GOING OFF

MUSIC: SUSPENSE UNDER

BILL. Wilbur jumped up wide awake and began to moan and groan and flap his sheet. The Giant looked down his high hundred feet and opened his one eye in terrible fright. And then, with his green hair streaming out behind, he turned and ran down the highway and out of sight, never to return. . . .

BILL. Get out your chalks and your large sheets of paper. And Let's Draw!

ORGAN: IN FOR 3 MINUTES—GHOSTLY BUT HAPPY—OUT ON SIGNAL FOR:

SOUND: ALARM CLOCK

BILL. There goes Wilbur's alarm clock again.[6]

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[6] *Ibid.*

After further and repeated radio instruction, pictures were created in innumerable classrooms by endless numbers of participants in the school radio art classes.

Art might seem less well adapted to radio than science, news of the day, or music appreciation; but as well-trained teachers, subject authorities, and radio technicians work together on the problem of enriching instruction, teachers and pupils can together expand their horizons.

Two other characteristics make classroom radio programs valuable learning experiences. Classroom radio can re-create historic events through dramatic reënactments of important past events. It can also bring into or interpret current events in the school. This can be done by direct news broadcasts as such, or through dramatic reënactments of important news events. (See page 281.)

SELECTING AND USING SCHOOL RADIO PROGRAMS

The first responsibility of the teacher who wishes to use radio is to understand its characteristics and to select the broadcasts in terms of their probable effect on pupil learning. Some of the more important questions to be considered in selecting a broadcast for classroom use are the following:

1. Does preliminary information about the program indicate that the content will assist in the classroom work planned for the time of the broadcast? Minor differences in time or dates can be adjusted by planning flexible schedules.

2. Does advance information or previous acquaintance with the series indicate that interesting writing, subject authenticity, and high-quality acting, narration, and dialogue are identified with the program?

3. Will the broadcast provide worth-while experiences which are pertinent to the regular school program and embody information, ideas, or techniques that add to or constitute a useful experience beyond what the classroom teacher can provide with the materials of instruction that are already at hand or are more easily accessible than the radio program?

4. Are interest-awakening and worth-while study and learning techniques used in the radio broadcast, such as (a) advance information to teachers in the form of radio teaching manuals; (b) means of gaining pupil participation such as those already described; (c) classroom mate-

rials such as maps and slides during the broadcast to help visualize it; (d) definite suggestions for pupil follow-up activities after the broadcast?

5. Are scripts or transcriptions of the broadcast available so that they may be read, studied, or even performed by the students after the broadcast?

6. Are related audio-visual materials available or suggested for use?

The teacher should select programs which offer a promise of meeting the needs of the class. After he has investigated the program or series, he should select only the broadcasts that provide valuable and needed experiences. A teacher should never feel obliged to use a broadcast just because it is scheduled.

Once a radio program has been selected, the teacher should assume definite responsibility for its carefully planned use in the classroom. While this is not always possible in the case of current events or news broadcasts, the day-by-day use of radio imposes definite utilization responsibilities on the teacher, which in turn yield results in terms of increased interest and efficiency of learning.

In general, five factors in connection with the use of radio in the classroom should be considered by the teacher:

1. Motivation.
2. Removal of barriers.
3. Effective listening.
4. Creation of an effective listening environment.
5. Follow-up activities.

MOTIVATION

The presence or absence of interest in learning is the greatest factor in success or failure in classroom achievement. One of the teacher's key responsibilities is to arouse interest and enthusiasm in the young learners under his direction. Knowing in advance the general nature of a broadcast allows him to establish readiness for listening to it. The teacher can encourage the children:

1. To discuss ideas and information they already have about the subject.

2. To reveal their curiosity about the subject of the broadcast by discussing and listing things they are interested in knowing about or are puzzled over.

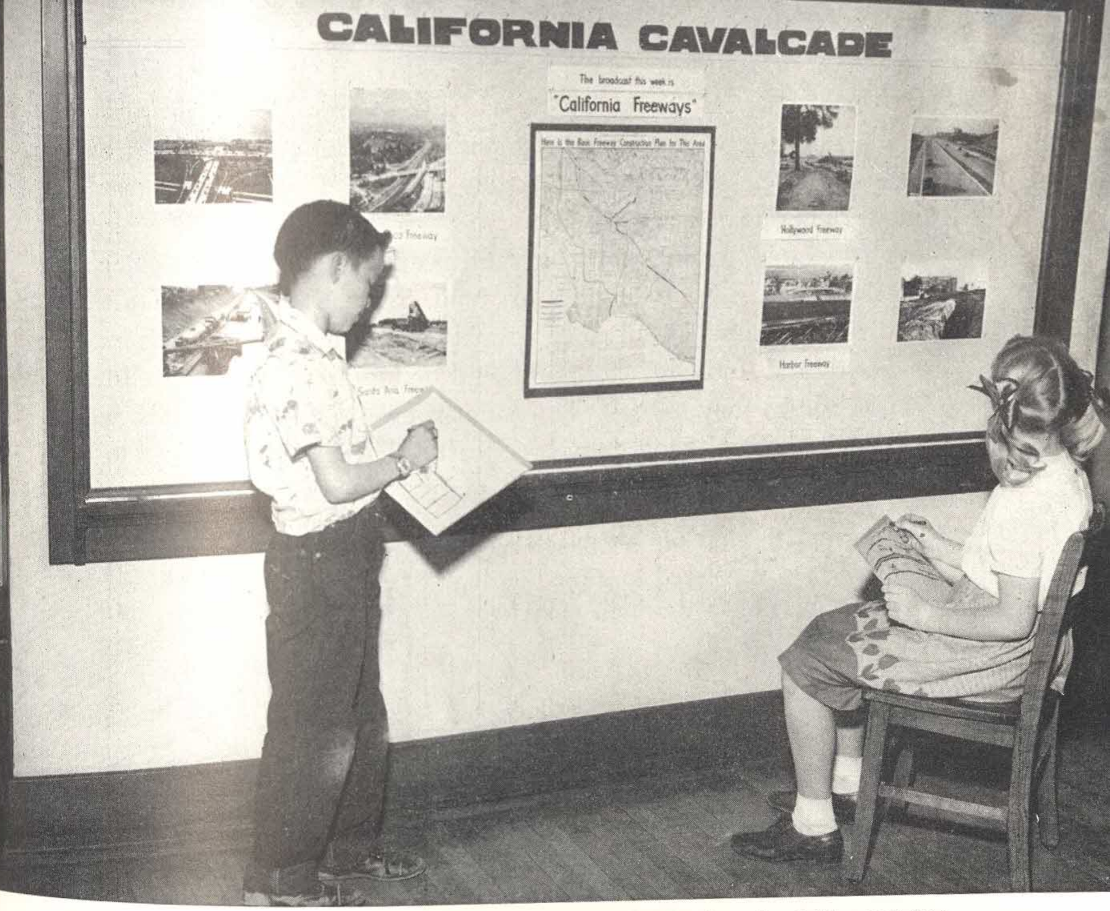

Fig. 10.3. What are "Freeways"? What are we interested in knowing about them? (Figs. 10.3–10.6 courtesy of Los Angeles City Schools.)

3. To report travel or reading experiences or information related to the forthcoming program which may create further interest in hearing it.

When a study period—for example, in arithmetic—is ended suddenly and a radio program about geography is quickly turned on, without any warning, many of the educational outcomes normally to be expected become impossible.

A fundamental improvement in classroom procedure can be made by including activities which gain the pupils' active interest in the work they are doing. In the absence of true pupil interest, little or no true learning can take place. Therefore, any motivational or interest-inciting activity which the teacher can plan in advance of the radio broadcast will increase learning outcomes. Such activities must have a direct bearing on the subject of the broadcast.

Since radio depends entirely on audio impressions, care must be exercised in anticipating possible barriers to complete understanding of the content of the broadcast.

Well-planned school radio programs capitalize on the teaching materials that are present in the classroom. Since the subject of a school broadcast is known in advance from the preliminary descriptions that are distributed to the teacher, he should be familiar with the prelistening responsibilities they suggest. This point is exemplified in a study manual covering a series of geography broadcasts.[7] The teacher is asked to have a physical map of North America available. The script is as follows:

NARR. Now, let's turn to another map, a *physical* map of the continent. This kind of map is colored to show the different heights of the land . . . from the flat prairies to the high mountains. Unroll the physical map of North America, please.

MUSIC: UNROLL OF MAP

NARR. Unroll those maps, everyone. And let's have a look at the ups and downs of North America.

The program continues with specific instructions to find the Laurentian Shield on the map:

NARR. From the air, the Shield looks like a flatland broken by many rounded hills and thousands of lakes and swamps.

TRAPPER. That's where I go trapping, all right. I can tell you, you might as well say it's water with land in between.

NARR. Yes, most of the Laurentian Shield is the land of the canoe. Remember, though, it's so big that it takes in almost any kind of weather. In the southern part, the weather is much like ours in Wisconsin . . . and if you go farther north, there's cold weather and snow a good share of the year. In winter people travel by dog sled. And far up north, at the top of North America, it's cold so much of the year the ground never thaws out and no trees can grow. This is the tundra or *treeless plain* where you find the reindeer grazing, and Eskimos about the only people. Most of the Laurentian Shield, large as it is, isn't a very comfortable land to live in.

Two prelistening responsibilities are evident here. (1) The pupils should be well acquainted with the physical map and its shaded areas, printed symbols, and place names. (2) Since the general subject of the

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[7] Wisconsin School of the Air, *North American Neighbors*, No. 1, September 19, 1949.

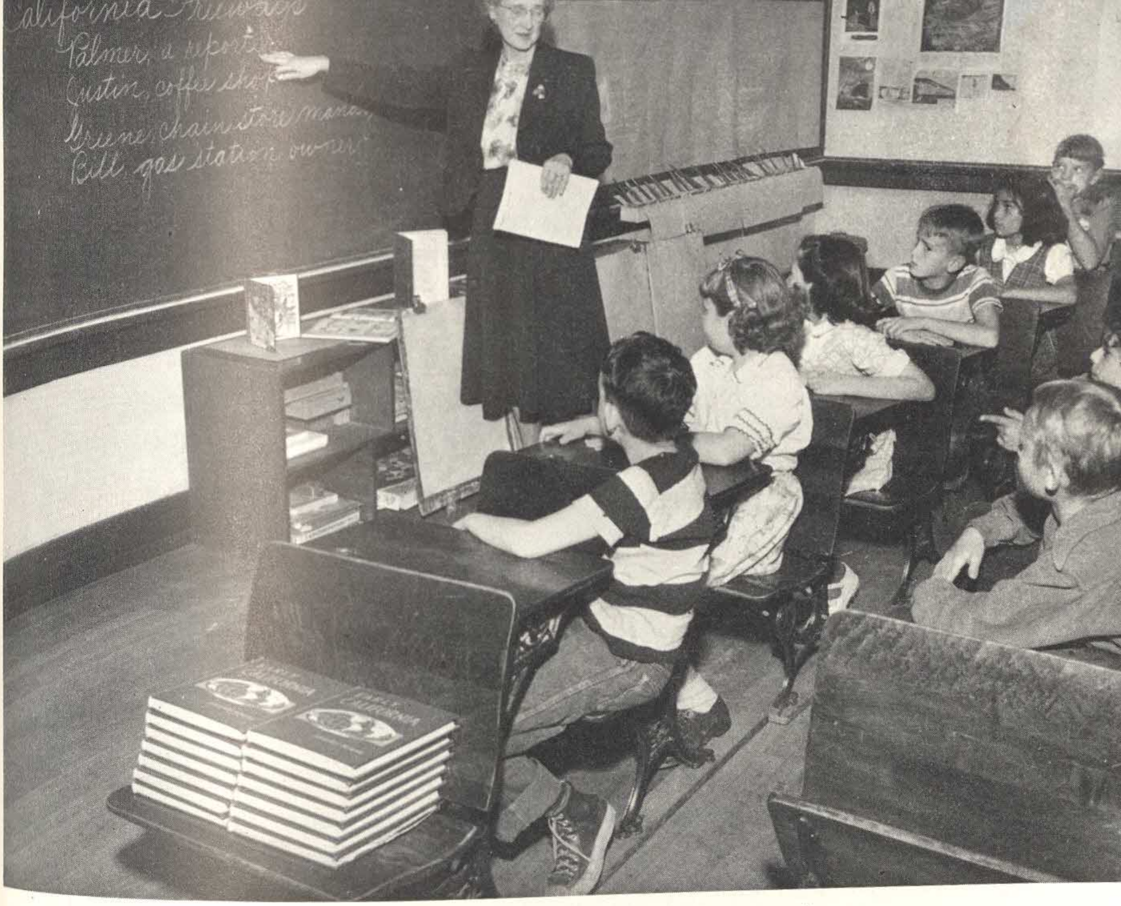

Fig. 10.4. The teacher describes the characters on the "Freeways" broadcast.

broadcast is the geography of North America, key terms—"shield," "Laurentian Shield," "tundra," etc.—should be studied beforehand.

But specific advance information about broadcasts is sometimes not available. If this is the case, the teacher will do well to watch the listeners' reactions. Unknown words, complex ideas that are explained too quickly or not sufficiently are often "recorded" as frowns, squints, and scowls, or just plain inattention. These are cues which point up the need for later clarifying discussion.

The child who knows what to expect, who has had some preliminary study on the content of the program, whose interest has been alerted will listen with increased benefit.

Wherever possible, preliminary preparations must be made prior to the actual school broadcast program. In the case of many well organized school broadcast programs, mimeographed materials, study manuals or preliminary announcements are sent to teachers well in advance of the broadcast so that any maps, pictures, materials, or equipment may be assembled which will be referred to then during the course of the broadcast proper.

Before each broadcast, the teacher and pupils together studied and planned for the program. . . . Thus there was high interest evident.[8]

EFFECTIVE LISTENING

In classroom study situations, "giving an assignment" is a time-tested practice. In using radio in the classroom there is danger in assuming that, because it is a new way of learning, careful planning is not necessary. This is not the case.

In reading a chapter in a textbook, the pupil who has a clear, workmanlike idea of what he wants to accomplish is more likely to realize his goal than the child who proceeds without a purpose. This is the case with the radio listener as well. The radio listener with a purpose will have a plan in mind. His search for information will be selective. He will be better able to attach significance to important points and discard less valuable ideas.

Suggestions for listening may take varied forms. The teacher and the class may discuss and list purposes. When a series is being broadcast, the listening plan may be modified and improved by the children as the broadcast continues.

Ada M. Super reports on the idea of making each child a "radio reporter and critic":

> In presenting the idea to the children, I found that it was necessary to discuss with them the various elements that constitute a radio program as well as the planning that they would be required to do if they were to reach any degree of efficiency as reporters. . . .
>
> Our next step was to set up a pattern for listening which took the form of an outline to be used as a guide. . . . The following outline was planned by the children:
>
> 1. Title of the program.
> 2. Review of story (author, synopsis, etc.).
> 3. Evaluation of the sound effects used.
> 4. Evaluation of the music selected.
> 5. Evidence of character building.

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[8] Gertrude Novokovsky and E. K. Weber, "Utilizing Radio in the Classroom: Increasing Self-Expression," *See and Hear*, November, 1948, pp. 26 ff.

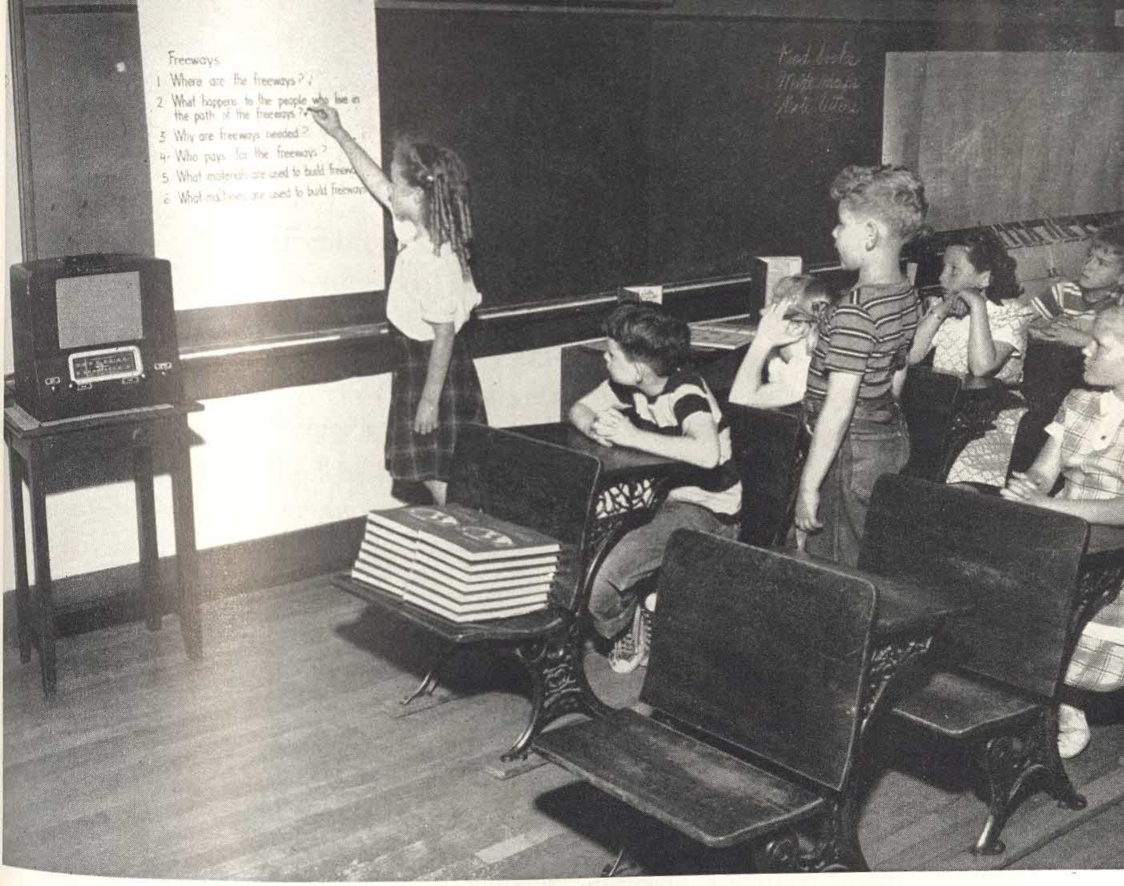
Freeways
1 Where are the freeways?
2 What happens to the people who live in the path of the freeways?
3 Why are freeways needed?
4 Who pays for the freeways?
5 What materials are used to build
6 What machines are used to build

Fig. 10.5. The children list their own listening purposes.

6. Educational value of program.
7. Emotional appeal of music or story, etc.
8. Statement of reporter's opinion or reaction.[9]

The children should be encouraged to create their own listening purposes (Fig. 10.5). Pupils who do this are usually highly motivated while hearing a broadcast.

As the children volunteer important questions they want answered, other pupils list these on the chalkboard. Such items as names of important people, facts, dates, places, uses, etc., become clues for listening. Whenever possible, the listeners themselves should plan their own activities.

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[9] Ada M. Super, "Oral and Written Communication," *See and Hear*, November, 1948, pp. 27 ff.

CREATION OF AN EFFECTIVE LISTENING ENVIRONMENT

The schoolroom can be a very satisfactory place in which to listen to the radio. This, of course, necessitates enough receivers so that each room will have ready access to the radio at exactly the time it is needed. The use of the auditorium or a radio listening area other than the classroom is not desirable. Teachers and pupils who have grown accustomed to the classroom as the place in which their day-to-day work is being done should be able to listen to the radio there.

Ordinarily the area directly in front of the radio is most effective for hearing. This is true because sound waves that come directly from the loud-speaker are less distorted than if they first strike reflecting surfaces. An extension cord should be used in classrooms where the only outlet is in the back of the room, so that the children will not have to turn uncomfortably to face the radio. It is desirable that the radio be placed so that all may hear easily as they sit in their usual places.

By moving the radio to the front of the room and away from sound-reflecting surfaces (Fig. 10.6), good listening conditions can be provided without upsetting the entire classroom. In some cases, having the children arrange their seats in a shallow arc before the radio makes for better listening.

The attitude of both children and teacher during the broadcast should encourage complete attention. Casual conversations should be eliminated. Complete attention should be fixed on listening. By his own attitude the teacher can help create an attentive listening attitude in the pupils. Interruptions should be discouraged. Some teachers put cardboard signs on the door during broadcasts: "Please—we are listening."

One of the most important functions of the teacher during a radio broadcast is to terminate a program that does not fit. Occasionally, in spite of the most careful preliminary study and selection, an inappropriate program will come through. If that happens, turn it off.

FOLLOW-UP ACTIVITIES

The school radio broadcast is a learning experience—one of many such experiences. As such, it must be absorbed into the learning and project activities that are going on in the classroom. A radio program cannot provide maximum value if it is listened to and then left, regarded as a transitory experience.

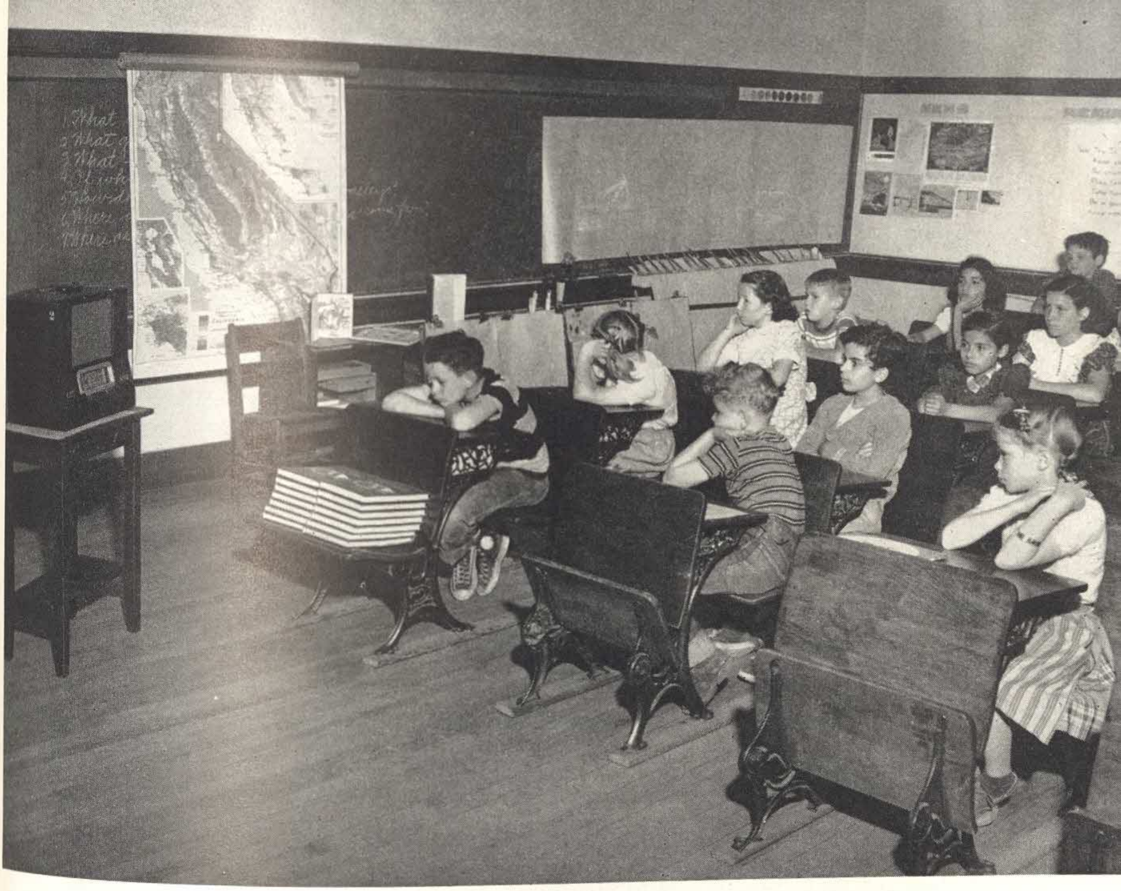

Fig. 10.6. The radio is placed so that all can hear easily and give it their undivided attention.

Follow-up opportunities which spring from radio listening are as numerous as the ideas of ingenious pupils and teachers. The extent to which a radio program requires follow-up activities is one good way of judging the effectiveness of the broadcast as such. Search for additional information, art activities, work in language skills, creation of student-participation broadcasts, and reading research are only a few of the many possible follow-up activities.

One outgrowth of the "Afield with Ranger Mac" programs of the Wisconsin School of the Air took on more than school-wide significance, for it reached right out into the community (Fig. 10.7). There in coöperation with the forward-looking work done by the 4-H Clubs of the state:

> Wisconsin school children, many of them inspired by Ranger Mac, have planted more than 7,000,000 trees in 214 school forest plots. One school publishes a monthly nature magazine called "The Trailhitter." Others have estab-

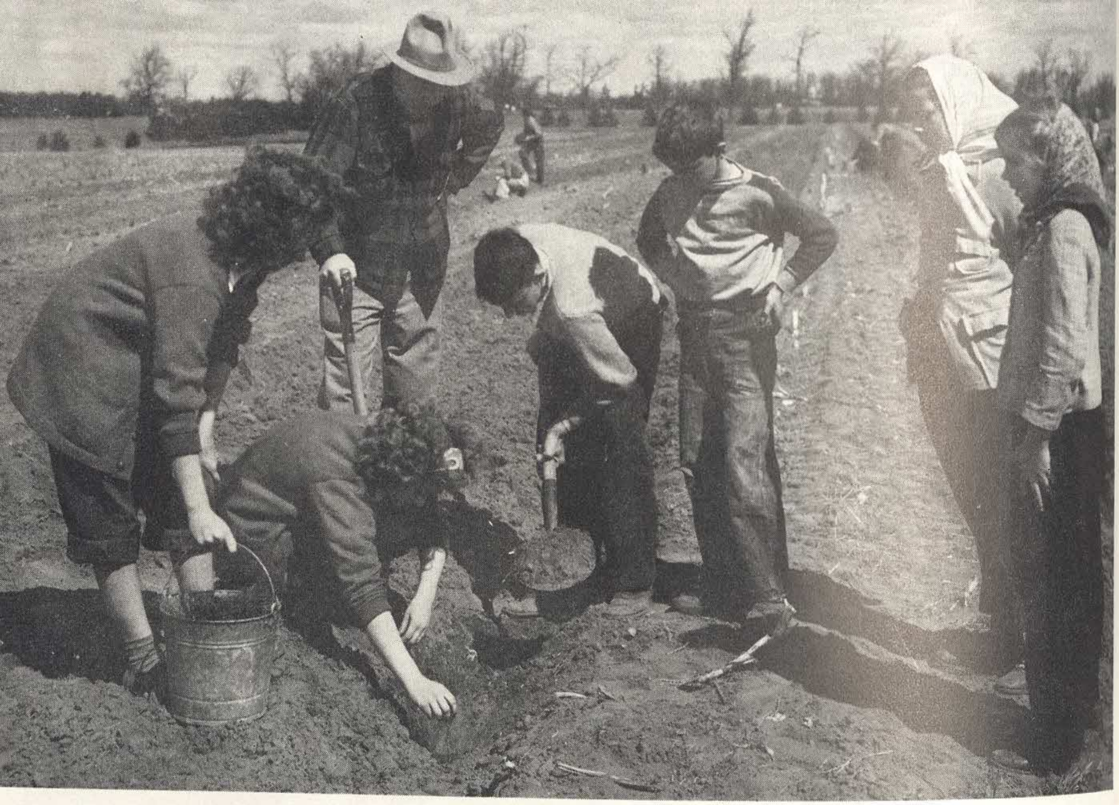

Fig. 10.7. This community project was radio-inspired. (Courtesy of University of Wisconsin Station WHA.)

lished school museums, made vivariums, and in a variety of ways carried on the explorations of nature begun for them on the radio while "Afield with Ranger Mac." More important than these activities, Ranger Mac believes, is "the training in the worth of their natural heritage that the children carry over into adulthood."[10]

In another situation radio was a natural means of coördinating other types of school work. Mary Dale Steele reports that in Omaha radio production projects grew naturally out of field trips taken by secondary-school students. The student-written and -acted accounts of experiences during field trips to industries in Omaha became the basis for a series entitled "Everyday Science."

> In the series, "Everyday Science," we have found an opportunity to combine audio and visual education into real experiences. The trip to a packing house was the basis for *Beware, Pink Meat*, with packers and government inspectors

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[10] Richard S. Milbauer, "Wisconsin School of the Air," *Amerika*, U.S. Department of State, June, 1949.

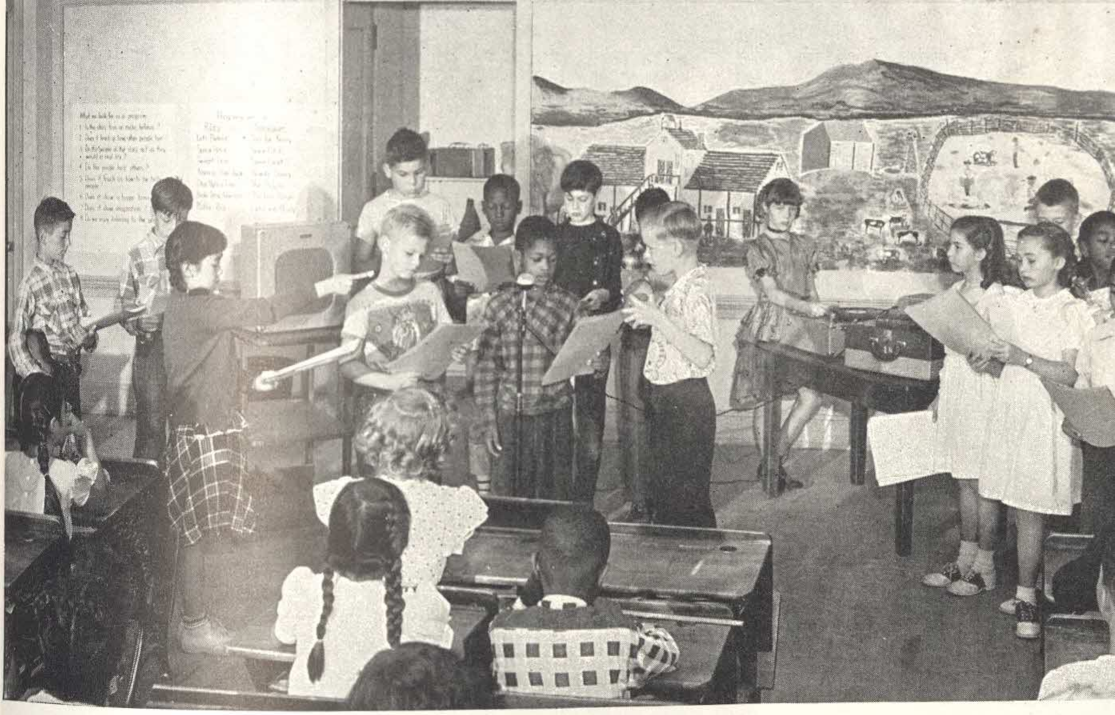

Fig. 10.8. Many language arts skills are practiced in creating a mock broadcast. (Courtesy of Los Angeles City Schools.)

appearing on the broadcast with the pupils. *So You're Wearing a Rabbit* grew out of a trip to the furrier who had trapped for twenty years in the Hudson Bay area, and had turned naturalist and author as well.[11]

Still other types of follow-up activities growing out of school broadcasts have been described by Dorothy L. Gilmore, teacher at the Grant Elementary School in Tacoma, Washington. They include class-inspired speaking activities stressing tone quality, enunciation, diction, and poise which the students observe in the radio actors themselves during the broadcast. Here is an opportunity for any speech or language arts teacher to find good models of diction and enunciation. Miss Gilmore describes other effects of such activities:

> Perhaps one of the most outstanding examples of this creative activity in a radio project is found in the work of the sound effects "men." For instance, in one of our fifth-grade "radio broadcasts" several boys created devices for sound effects. Our play was *Hans Brinker and the Silver Skates,* made suitable for this type of program by Gertrude Kinscella in *Conrad's Magic Flight.* One boy did a little research work and found in a science magazine a suggestion for making

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[11] Mary Dale Steele, "Radio: Omaha Pattern," *See and Hear,* December, 1947, pp. 22 ff.

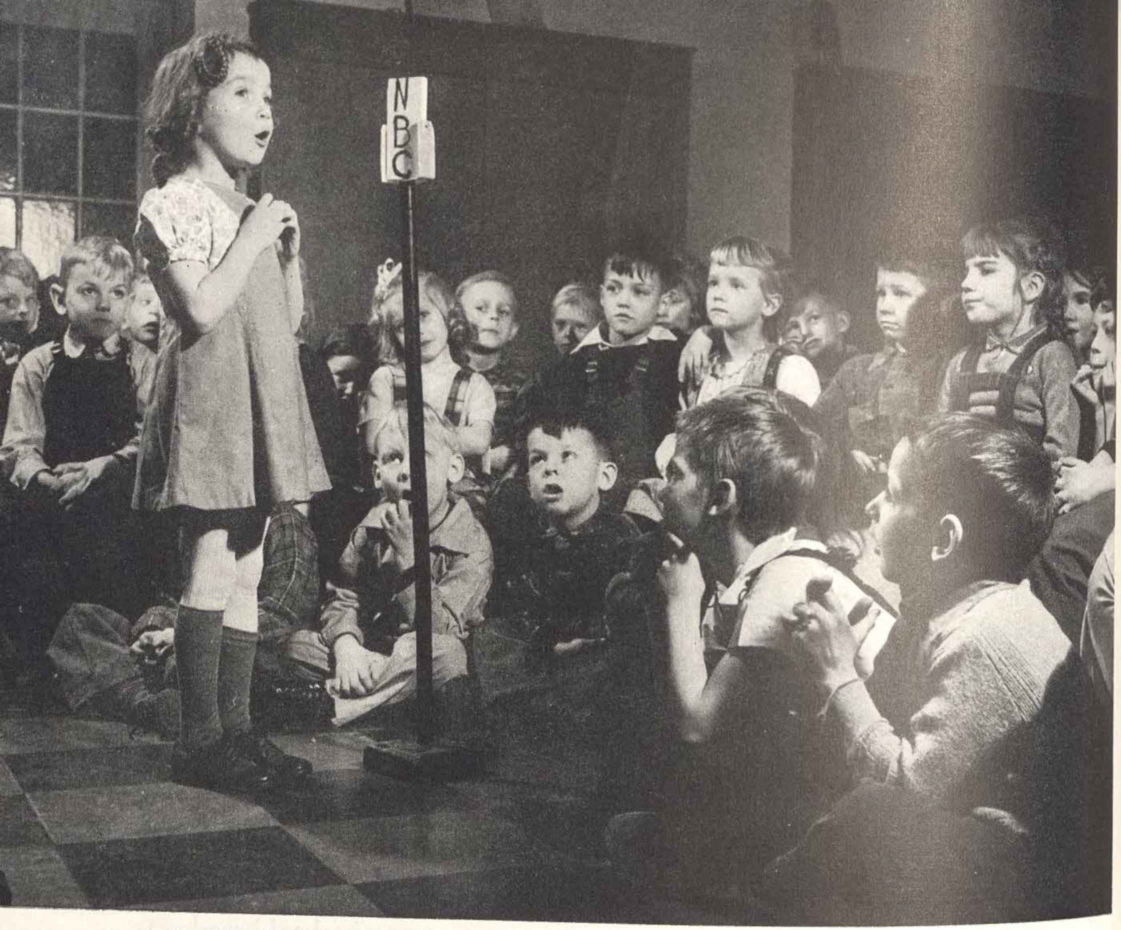

Fig. 10.9. "This is the way I'd tell a story over the radio." Note how many of the children identify themselves with the situation. (Courtesy of Madison, Wisconsin, Public Schools.)

the sound of skating on ice. Another boy produced a device for the effect of a cart rumbling over a rocky road.[12]

Other carry-over activities follow school broadcast participation. Annie K. Odell describes how the listening habits which children attained in school became apparent:

> The radio programs were so important to the children that they asked their mothers to tune in on the same programs they were hearing in school. This, of course, brought the home and school closer together.
>
> I cannot enumerate the many ways radio has helped to enrich the lessons taught in the classroom. Children become better listeners and keener observers.

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[12] Dorothy L. Gilmore, "Radio . . . as a Teaching Aid," *See and Hear*, January, 1948, p. 25.

> The radio stimulates them to do extra work and creates in them an urge to do some worth-while, out-of-school listening. Certainly the use of the radio made the children's school work a more fascinating, living challenge.[13]

When school broadcast programs are planned by capable teachers and subject specialists and are executed by skilled radio technicians and actors, a new area of instructional materials is revealed to both classroom teacher and pupils. In more and more schools radio programs are scheduled for release so as to have maximum effectiveness in terms of the school child and his needs.

SELECTING A RADIO RECEIVER

Until recently amplitude modulation (AM) radio receivers were almost universally used. Today, however, increasing numbers of frequency modulation (FM) receivers are being used, and many school broadcasters have added FM or shifted from AM to FM.

> Frequency modulation, or FM, has become a useful tool in education, on both the broadcasting and receiving ends. The Federal Communications Commission has reserved 20 FM channels for non-commercial educational use, thereby making it possible for schools to put their own stations on the air. There are approximately 100 such educational stations on the air in addition to some 640 commercial FM stations.
>
> As the result of these stations and the more ready availability of broadcast time for educational programs, schools are turning to FM reception. In congested city areas having a high local interference level, FM gives a static-free signal. In rural schools which formerly got interference from lightning, atmospheric disturbances, "high lines," transformers, electric fences, and other types of man-made static, FM gives clear reception.
>
> Engineers predict that, because of the similarity of the transmission characteristics and requirements of FM and TV, these two media will be closely linked in the future development of the radio arts.[14]

A most important development in FM is the steadily decreasing price at which a high-fidelity receiver can be secured for classroom use. Such sets as that shown in Fig. 10.10 indicate the type of equipment currently available.

Much discussion surrounds comparisons of AM and FM receiving sets for schoolroom use. One acknowledged weakness of FM—namely, the short range of the FM signal, usually 75 to 100 miles—is being overcome through network or relay stations. Several states—New York, Indiana, Wisconsin, and Minnesota—have planned state-wide networks (in three states they are virtually completed) which call for booster stations to relay FM signals to make complete state-wide coverage possible.

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[13] Annie K. Odell, "Radio and Nature Study," *See and Hear,* March, 1949, p. 22.

[14] From statement made in 1952 by Harold Engel, Division of Radio Education, University of Wisconsin.

What characteristics make FM radio receivers desirable? As Engel said, FM reception is not affected by electrical interference or static induced by either natural causes or man-made electrical equipment. FM reception is not impaired by nearby high-tension power lines, large electrically driven machinery, electrical storms, or other static-producing phenomena. Briefly, this is due to the fact that a basic similarity exists between AM carrier signals and the "signals" emanating from power lines, electrical storms, electric motors, etc. Hence the average AM receiver detects and amplifies either or both of these types of signals, whereas FM receivers detect and amplify only FM signals.

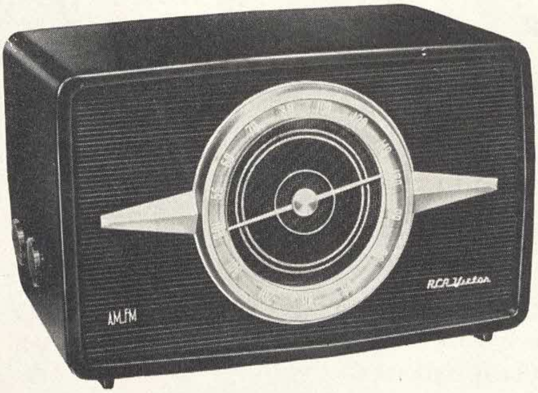

Fig. 10.10. AM-FM radio with 8-inch speaker. (Courtesy of RCA Victor.)

An even greater reason for the increasing use of FM is the fact that broadcasting licenses give greater leeway to FM than to AM stations. Almost all the AM radio channels are assigned to powerful commercial stations. There are more "open" FM bands, however, which means more time "on the air" for educational use. No longer is it necessary for educational programs to curtail the time of broadcast because of competition from commercial sources. The more efficient FM receiving sets and the decrease in their price are two hopeful signs for schools that are contemplating equipping each classroom with high-fidelity radios.

Selecting a radio should be a coöperative project for the radio expert and the classroom teacher. It is their responsibility to see that the programs come into the classroom and that they can be heard with sufficient volume and without annoying interference. Classroom radios should be inexpensive, of sturdy construction, and easy to operate.

Although no detailed descriptions of radio receivers will be given here, the following criteria for selecting suitable classroom radios are suggested: (1) Until either AM or FM school broadcast facilities become universal, a combination AM-FM receiver should be chosen. (2) A low-cost set should be considered only if it offers high-fidelity tone reproduction, simplicity of operation, good volume, self-contained antenna, light weight, and operational safety. Fortunately several AM-FM radio receivers are now available which combine high-quality performance and low cost.

LOCAL SCHOOL RADIO FACILITIES

In the vanguard of the efforts being made to overcome the traditional problem of timing the school broadcast exactly when it is needed is that of the Cleveland Radio Plan. School broadcast programs originate through FM facilities owned by the school board, and transcriptions are immediately made of each broadcast. Thus the programs can be rebroadcast again and again at the teachers' request. In the case of such broadcasts the general public need not be considered. Rather, once the classroom teacher has listened to the original program, she has an opportunity to bring it to the attention of her pupils by asking that a transcription of it be broadcast.

The creation of school radio facilities need not be confined to large cities. Radio station WNAS[15] is an example of what can be accomplished in a small community (see Fig. 10.11).

WNAS is a low-power FM noncommercial educational station owned by the public-school system of New Albany, Indiana. It is considered a teaching tool for the city schools. The Department of Audio-Visual Instruction has the responsibility for its successful operation from the technical and educational standpoints.

Although many teachers and supervisors have assumed responsibility for the production of regularly scheduled programs, the students operate the equipment, do the announcing, and write and direct their own shows. No adult has any part in over half of the "live" shows, except to proofread the scripts for possible errors. A great number of the broadcasts are unrehearsed; even first-grade students are used.

The station's student staff consists of two workshops of twenty care-

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[15] Vernon McKown, *The Story of WNAS, Pupil Radio Station for New Albany, Indiana*, New Albany City Schools, Dept. of Audio-Visual Instruction, mimeo., 15 pp.

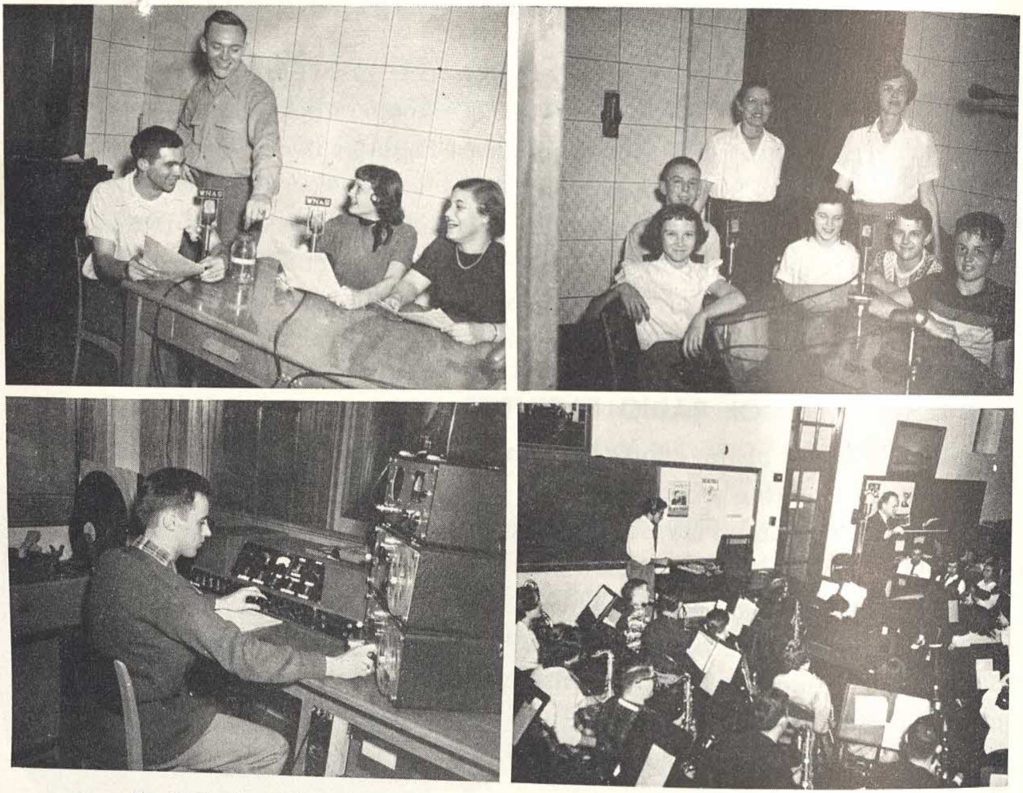

Fig. 10.11. *Top, left:* Students actually helped finance and now run WNAS. *Top, right:* Librarians and grade-school children broadcast a literary quiz show over WNAS. Junior-high-school book circulation has doubled. *Lower, left:* A high-school senior operates the controls of station WNAS. *Lower, right:* The school band records a broadcast for WNAS. (Courtesy of New Albany, Indiana, City Schools.)

fully chosen seniors who meet during the two hours WNAS is on the air each day.

The station makes no attempt to compete on a professional level with the ten commercial stations in its coverage area. Its programs have been well received. The 10-watt station has been heard as far away as thirty miles, has regular listeners twelve miles away, and covers fairly adequately a population area of half a million people.

Station WNAS is a dramatic "follow-up activity" growing out of the interest shown by teachers, pupils, and community in education by radio.

EVALUATING EDUCATIONAL BROADCASTS

For the classroom teacher contemplating the selection, use, and mechanical aspects of radio programs, the following check list of evaluating criteria is offered:

For the Teacher

1. Am I aware of school radio broadcast sources?[16]
   a. Offered through NBC, CBS, ABC, Mutual.
   b. Offered through state and regional channels.
   c. Originating in nearby cities.
2. Have I selected the best school broadcasts that are in my school's range of reception? Consider such points as the following:
   a. Does the school broadcast create a useful learning experience?
   b. Are teachers' manuals or scripts available in advance? If not, is it possible to secure scripts after the broadcast?
3. Have I assumed full responsibility for planning the effective use of the school broadcast?
   a. Have I studied the teachers' manual or, if possible, the script itself?
   b. Have I conducted motivational activities prior to the broadcast?
   c. Have I helped the pupils understand their purposes in listening?
   d. Have I planned on how to remove possible barriers to instruction?
   e. Have I carefully arranged for the most effective listening in my own classroom?
   f. Did I encourage follow-up discussion?
   g. Have I thoroughly investigated all the opportunities for child-centered follow-up activities in art, language arts, field trips, etc.?
4. Have I appraised the effectiveness of the broadcast in terms of the learning needs of my children?
   a. Was socially desirable information included in the broadcast which the group needed for further learning in connection with the school work?
   b. Did the broadcast encourage and make provision for listener participation?
   c. Were illustrations clear-cut and included in the background experiences of the learners?
   d. Did the program help inspire follow-up activities?

For the Pupil

1. Was the radio broadcast interesting to me? Why?
2. Was I able to hear the broadcast clearly and distinctly?
3. Did I do my best to contribute ideas in the discussion after the broadcast?

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[16] Federal Security Agency, U.S. Office of Education, Educational Radio Script and Transcription Exchange, Federal Radio Education Committee, Washington, D.C., *Radio Script Catalog*, 5th ed., 105 pp.; supplement (mimeo.), 1950, 17 pp. Radio scripts of outstanding education programs are available for loan. Copies of single scripts may be kept for three weeks and a series for four weeks. There is no expense to the borrower except for the return by insured parcel post. Scripts from the "American Democracy at Work" broadcast, "Health and Nutrition," "American History," etc., are available.

4. Did I do my part in helping arrange projects and participate in them following the broadcast?

SUMMARY

Radio school broadcasts as they are currently planned and executed have many advantages. They make available master teaching techniques to all the schools in the reception area. They enable the combined thinking of many specialists to be made available to the one-room rural school at the end of the most remote township road. Through them, inspiring classroom teaching techniques can be made an integral part of the day-by-day teaching procedure. Most important, they are learning experiences in which pupils can participate with interest and profit.

To be of maximum benefit, school radio programs must be carefully selected by the teacher in terms of their usefulness in meeting the learners' needs. Good utilization practices include careful selection; preliminary planning, discussion, and other activities in which pupils get ready for the broadcast; provision of good listening situations; and finally an opportunity for follow-up discussion and other activities.

Modern school broadcasts can be a modern genie for the teacher who selects appropriate programs for the classroom.

Suggested Activities

1. Interview persons engaged in educational radio work to discover:
   a. The nearest sources of educational broadcast programs.
   b. Where the effective use of radio in the classroom may be observed.
   c. Listings of current classroom broadcasts.
   d. Where equipment may be seen in use or on display.
2. Investigate the means of recording current radio programs for future use in the classroom.
3. Plan for the use of a radio program in a specific teaching situation. Consider such things as:
   a. The characteristics of radio which make it particularly useful as a learning experience.
   b. The teacher's responsibilities in using a radio program effectively in the classroom.
   c. The responsibilities of the pupils before, during, and after the broadcast.
   d. Arranging the listening environment.

   e. Encouraging children to develop ideas for follow-up activities and assume responsibility for executing them.
4. Get a local dealer to explain combination AM-FM radio receivers.

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11. Educational Recordings

"Our school is on the Cassville road, twenty miles from Neilton. But today a great scientist was in our room to tell us about the atom and atomic energy. It was very interesting."

Had an international authority on atomic energy actually visited this remote rural school? Yes, but not in person. Through a recording his voice, his enthusiasm, and his authoritative information had been brought to the children in a school 2300 miles from California, the home of this great scientist.

In another classroom in a nearby community: "Today we listened to Alexander Graham Bell. I stood so near I could hear the first words ever to travel over the telephone. It was thrilling. . . ."

An enthusiasm for reading and for doing simple research was kindled in these learners as they listened to an amazing dramatization of truth and information about a great inventor's triumph, the development of the telephone.

Through records and transcriptions a new world of experience can be brought to any school in the country. They can be used whenever the teacher believes that an audio-learning experience is essential to the progress of school work.

It is not surprising that since World War II thousands of new audio learning devices—recording and transcription "playbacks" or turntables

—have found their way into our classrooms. They are electronic devices. But they are more than that. The record and transcription player can bring real-life documentations of utterances and events into any classroom.

More valuable is the pupil interest which surrounds the use of recordings and transcriptions. This is probably due to the fact that much of our traditional school work has been carried on without the benefit of sound.

WHAT ARE EDUCATIONAL RECORDINGS?

Educational recordings are sources of information that are comparable to books and other means of bringing information to the attention of learners. Educational recordings present their information through audio imagery. This information may be mechanically inscribed on traditional recordings, on electrical or instantaneous transcriptions, or on long, narrow ribbons of tape. In each case the practical purpose is to capture original sound and preserve it for later use.

Today the teacher who is investigating recorded information may find it in the form of ordinary phonograph records with which he has had long acquaintance. These records rotate 78 times per minute and can be played on an ordinary phonograph; their length varies from 3 to 6 minutes for one side, and their diameter from 6 to 12 inches.[1]

Transcriptions are similar to phonograph records except that they allow for more economical use of the transcribed material. Transcription disks rotate at slower speeds, are larger, and consequently "hold" longer programs. Transcriptions first came into wide use for radio rebroadcast purposes. Carefully rehearsed radio programs are recorded and listened to, edited or corrected as necessary, and finally broadcast. These radio programs can be duplicated by making transcripts of the original. The transcriptions can be sent long distances and to many radio stations for rebroadcast.

Today schools use transcriptions which may originally have been made for radio broadcasting, for the material on them very often lends itself well to school use. Hence radio transcriptions are rapidly becoming a rich source of school learning material.

Transcriptions vary in size from 14 to 18 inches. The 16-inch is the

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[1] Because long-playing records at other speeds such as 45 r.p.m., etc., are not yet closely identified with educational materials, they are not discussed here.

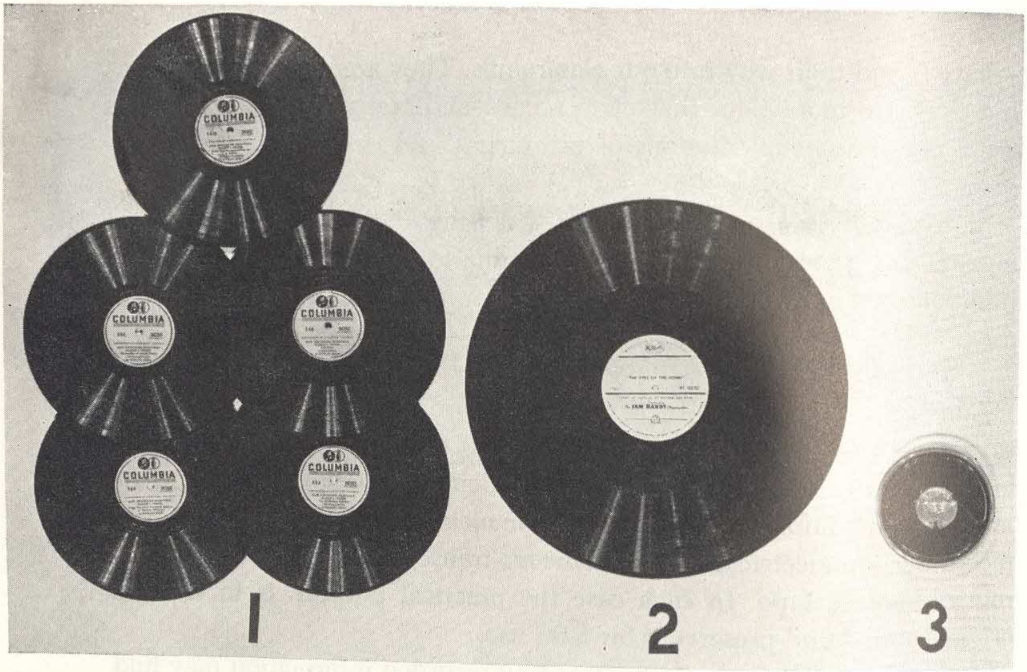

Fig. 11.1 Three forms of recording thirty minutes of material: (1) 78 r.p.m. recordings; (2) transcription; (3) tape recording.

most commonly used size, carrying approximately 15 minutes of program material on each side. As a basis of comparison, a 16-inch double-face transcription provides approximately as much material as do three double-face 12-inch records of the older and more traditional type. Extensive developments in the use of transcriptions in radio broadcasting have led to improvements in materials and techniques which are today being enjoyed by schools.

Still another type of recording that is being increasingly used is made on a long tape that is coated with metallic oxide. This type of recording offers economy of cost, ease of handling, permanence, and freedom from wear, dust, and other deteriorating factors which are characteristic of records and transcriptions.

Tape recordings may be made originally in the school or from radio programs or from "on the spot" current events situations. They vary in playing time from 15 minutes to one hour depending on the make of the machine, the size of the spool, and the speed with which the tape is run through the machine. The various kinds of record, transcription, and tape machines will be discussed later, as will their use in teaching.

In using records, transcriptions, and tape recordings, the teacher is primarily concerned with the information they contain and with the opportunities thus offered for realizing educational goals.

CHARACTERISTICS OF EDUCATIONAL RECORDINGS

All the advantages already ascribed to the use of radio in the classroom apply to educational recordings. That this is true is seen in the fact that today increasing numbers of outstanding school broadcasts are available as records, transcriptions, or tape recordings. However, there are four characteristics which make educational recordings particularly valuable as teaching materials.

1. *Educational recordings can bring the utterances and ideas of politically or socially important persons into any classroom.*

The goal of every teacher is to bring living experiences to his pupils. Opportunities to do this vary with subject areas and with the school and its facilities. In the lower grades it is comparatively easy to provide the children with learning opportunities which they can see, examine, listen to, or even participate in. In the higher grades, first-hand experiences may be more difficult to incorporate into study situations. History takes place in the past. Science often involves learning experiences which are inaccessible. Geography calls for the study of distant peoples and places. In these cases the teacher must search for a means of creating a living or almost lifelike experience for the children. In well-planned and carefully created transcriptions the modern teacher sees his opportunity.

In the days of Abraham Lincoln, only a select few could attend a presidential inauguration. When the Union Pacific Railroad was completed, the only ideas which people of that day could have of that great event were gained by reading the accounts written by the few who were there. Even with today's radio reporting, a current events broadcast is of the moment and then gone forever—unless the words and sounds have been recorded on records, transcriptions, or tape.

Imagine how students would feel if, when they study the causes and effects of the Civil War, they could hear the Gettysburg Address just as it was spoken, if they could listen to the Lincoln-Douglas debates. Unfortunately, we do not have these learning materials, but we do have recordings of the major events of World War II. Educational recordings can today bring into the classroom the actual voice of a famous news analyst as he broadcast on September 3, 1939: "Great Britain went to war against Germany today, 25 years and 30 days from the time she entered the War of 1914 against the same enemy. France is expected to follow suit within the next few hours."[2]

The sound of the voice which first announced this news makes an almost indelible impression in one's memory. The intonation, the terseness, the slow pace of speaking which characterized this announcement have been captured forever through the medium of modern recording devices.

Through educational recordings the highlights of the events leading up to the successful culmination of that war are available for use in any history class in the country. The voices of the great personalities of that day—Churchill, Eisenhower, Willkie, Franklin D. Roosevelt—have been recorded and can be heard by every learner. Through recordings President Roosevelt's own voice can speak to today's students and to those of tomorrow:

> Yesterday, December 7, 1941, a date which will live in infamy, the United States of America was suddenly and deliberately attacked by naval and air forces of the empire of Japan. The attack yesterday on the Hawaiian Islands has caused severe damage to American naval and military forces. I regret to tell you that very many American lives have been lost. With confidence in our armed forces, with the unending determination of all our people, we will gain the inevitable triumph, so help us God.[3]

Truly such materials of instruction as this will take on added importance as time passes. Students in 2000 A.D. will be able to study and listen to the leaders of today.

2. *Barriers of time, place, and distance are overcome by the use of educational recordings.*

The teacher of a junior-high-school social studies class overheard a pupil say, "I wish we could get the person who wrote this book to stop in and explain himself to us. I have lots of questions I'd like to ask him."

Although a discussion with someone who lives and works across the

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[2] Elmer Davis, "Great Britain Enters the War," newscast September 3, 1939—"I Can Hear It Now," Columbia Master Works, Edward R. Murrow and Fred W. Friendly, the chronicle of the war and the years of crisis told by the men who made history.

[3] President Franklin D. Roosevelt, "Declaration of War," December 8, 1941—"I Can Hear It Now," Columbia Master Works, Edward R. Murrow and Fred W. Friendly.

Pacific Ocean cannot be arranged, it is possible to bring his voice and ideas to students in this country through recordings.

Recently the Washington, D.C., schools and the U.S. Office of Education arranged for authorities to describe the countries they knew a great deal about. Dr. Horace Polman, who spent a lifetime studying the people of India, recorded his impressions of those people.[4] In twelve minutes he gave what he considered important information about them. In recorded form his words and ideas, based on many years of study and experience, can be "played back" in any classroom.

Similar recordings provide information on China related by Pearl Buck; the people of the Philippines are described by Carlos Romulo, former Resident Commissioner of the islands. In recordings, people throughout the world can speak to American children in their own classrooms.

3. *The thinking, planning, and creative skill of experts can be consolidated in educational recordings.*

It has been said that if the men who knew could always speak through the mouths of men who can talk, far more ideas would be revealed to people all over the world. The research scientist is best able to explain his subject, but too often he is too busy or too inaccessible to be of much assistance in solving problems of classroom instruction. By bringing together the authority on a subject, the creative writer, the radio technician, and the student of educational method, unique and effective teaching recordings have been produced.

On the campus of a great midwestern university, a group of researchers and educators recently developed a new audio technique for teaching basic language sounds. Now, through the medium of educational recordings, this effective phonic system is being taken into the classrooms in every state. Native-speaking people come, via recordings, bringing an authentic, interesting, and, if necessary, repetitious pattern of foreign-language pronunciation to the learners.

Readings of great literary works, both prose and poetry, have been recorded as a project of the National Council of Teachers of English.[5]

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[4] "The People of India," recording No. F164, 13 min., 33⅓ r.p.m., for sale or loan; *Catalog of Radio Recordings*, Federal Radio Education Committee, Washington, D.C., p. 41.

[5] National Council of Teachers of English, 211 W. 68th St., Chicago, Ill. Such poets as Robert Frost and Vachel Lindsay record their own poems. $1.75 per record; Frost, $2.75 per record. Masterpieces of Literature albums, including Basil Rathbone readings of 21 poems, are $5.90 per album.

Now the most famous works of English and American poets, recited by qualified personalities of the stage or literature, can be listened to and appreciated by children all over the United States.

4. *The teacher has complete control of the planning and use of educational recordings.*

Educational recordings are available to teachers as records (78 r.p.m.), transcriptions (33⅓ r.p.m.), or on tape (reels are 5 to 7 inches in diameter). Hence the recording is as flexible an instrument of instruction as the traditionally used textbook. If the recording is owned by the school, or even if it is on loan, the teacher can decide when it will be used. Thus, although originally scheduled for Wednesday at 10:00, the recording can be played at another time, if for any reason it appears desirable to the teacher.

The rapid increase in the number of educational recordings produced and the unique patterns of distribution of audio-learning materials which are currently being developed (see page 280) work to the advantage of the teacher. The producers and distributors of these materials are increasingly realizing that the teacher must have complete control of such material if it is to be used at the moment of greatest effectiveness—when the children *need* the audio experience and *want* to have it.

USING EDUCATIONAL RECORDINGS

Many radio programs are recorded. The use of these recordings in school may closely parallel the use of radio broadcasts discussed above on pages 261–273.

Teaching responsibilities involved in the use of recorded learning materials have many forms. In a Georgia state committee project, an almost entirely new method of reading poetry was established by means of a series of recordings on choral reading:

> The pupils of the fifth grade in Horace Mann School and their teacher, Miss Mae O'Brien, have worked out a way of reading poetry so that all of them can enjoy it together. It doesn't take a long time either. They are going to read together now. Before the next few minutes are over, each one will have shared in the reading of a poem. No, it isn't magic. The first verse they are going to read is an old, old one, probably as old as "Jack and Jill," maybe older, because we don't know how old "Jack and Jill" really is. The verse is called "John Cook Had a Little Grey Mare." The first line will be read by the teacher and the

whole group will answer. The answer is called a refrain because the pupils keep saying the same words over and over again.

Miss O'Brien. John Cook had a little grey mare
Whole Group. Hee haw hum
Miss O'Brien. Her back stood up and her bones were bare
Whole Group. Hee haw hum
Miss O'Brien. John Cook was riding up Shooter's bank
Whole Group. Hee haw hum
Miss O'Brien. And there his nag did kick and prank
Whole Group. Hee haw hum
Miss O'Brien. John Cook was riding up Shooter's hill
Whole Group. Hee haw hum
Miss O'Brien. And his mare fell down and made her will
Whole Group. Hee haw hum
Miss O'Brien. The saddle and bridle she laid on the shelf
Whole Group. Hee haw hum
Miss O'Brien. If you want any more you can sing it yourself
Whole Group. Hee haw hum.[6]

An audio experience such as this not only serves to bring a new pattern to teacher and pupil but creates a pattern which the teacher can alter as he devises further and different experiences in choral reading. The child finds pleasure and confidence in participating in this kind of audio experience. He likes the idea of imitating the words and inflections he hears. Following this recording, the teachers encouraged the children to read and select poems which they then arranged in parts for choral speaking. As this proceeded, the teachers slowly withdrew from reading, until finally all the lines were being read by groups of pupils, with solo parts read by individual children.

In other situations the nature of the recorded material may call for an entirely different utilization technique. The following excerpt from a recorded explanation of the atom is designed for high-school students and makes desirable the use of accompanying printed materials:

Everything in the world is made of atoms, your hands, the ring on your finger, the mashed potatoes, the hardest steel and the lightest gas. Of the ninety-six basic kinds of atoms, one of the heaviest is the Uranium atom. Let's try to get an idea of just how small it is. In the pamphlet before you find the

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[6] Effie G. Bathurst, *Phonograph Records as an Aid to Learning in Rural Elementary Schools*, University of the State of New York, State Education Department, Albany, 1943, pp. 127–128.

> letter "i" and look at the dot. How many atoms do you suppose would be in a chunk of Uranium metal the size of that dot over the "i"? Well, there would be as many as there are people in this room, and in all America, and in all China, plus the 400,000,000 in India, and the Russians, and all the people in the world. Yes, there would be that many atoms in your little speck of Uranium the size of a dot over an "i." But wait, that's only a small fraction. Actually, there would be one billion times that many—there would be 2,550,000 trillion atoms in that little dot.[7]

Because of the complexity of the subject being described, a manual of pictures and diagrams is supplied with the recording. The visualization is referred to as the need arises:

> We can see then that to determine the atomic weight of an atom just add the number of its protons to the number of its neutrons and that's it. Glance at the Helium atom again, in figure 2. Note the number of protons and the number of neutrons, add them together and that's the atomic weight of helium. Simple, isn't it?[8]

When the recorded experience is of such a nature that visualization is needed for complete understanding, it is the teacher's responsibility to supply it (Fig. 11.2). In some cases this visualization takes the form of the printed page. In others, simple chalkboard directions or diagrams, charts, or tackboard displays of selected pictures may be used.

In some educational recordings the plan of use is put into the original script and recorded as a preliminary listening experience. The audio description of the story of Colonel George Goethals and the building of the Panama Canal is an example. The teacher is asked to listen to the recorded background information, the use guide, and the dramatization itself, all *before* playing the recordings for the children. The purposes of the transcribed dramatization of Colonel Goethals' struggles in building the canal are enumerated:

> To help your students understand that great deeds have been accomplished by men and women who've had the courage and determination, the will to do, whether their struggle has been against nature or just the doubters who have said it can't be done.
>
> The second purpose—this dramatization can help give your students the

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[7] The Lewellen Club, "What Is an Atom?" broadcast by Neil Hamilton, 78 r.p.m., 20 min., 12 inches, Lewellen Club Productions, 8 S. Michigan Ave., Chicago, Ill.

[8] *Ibid.*

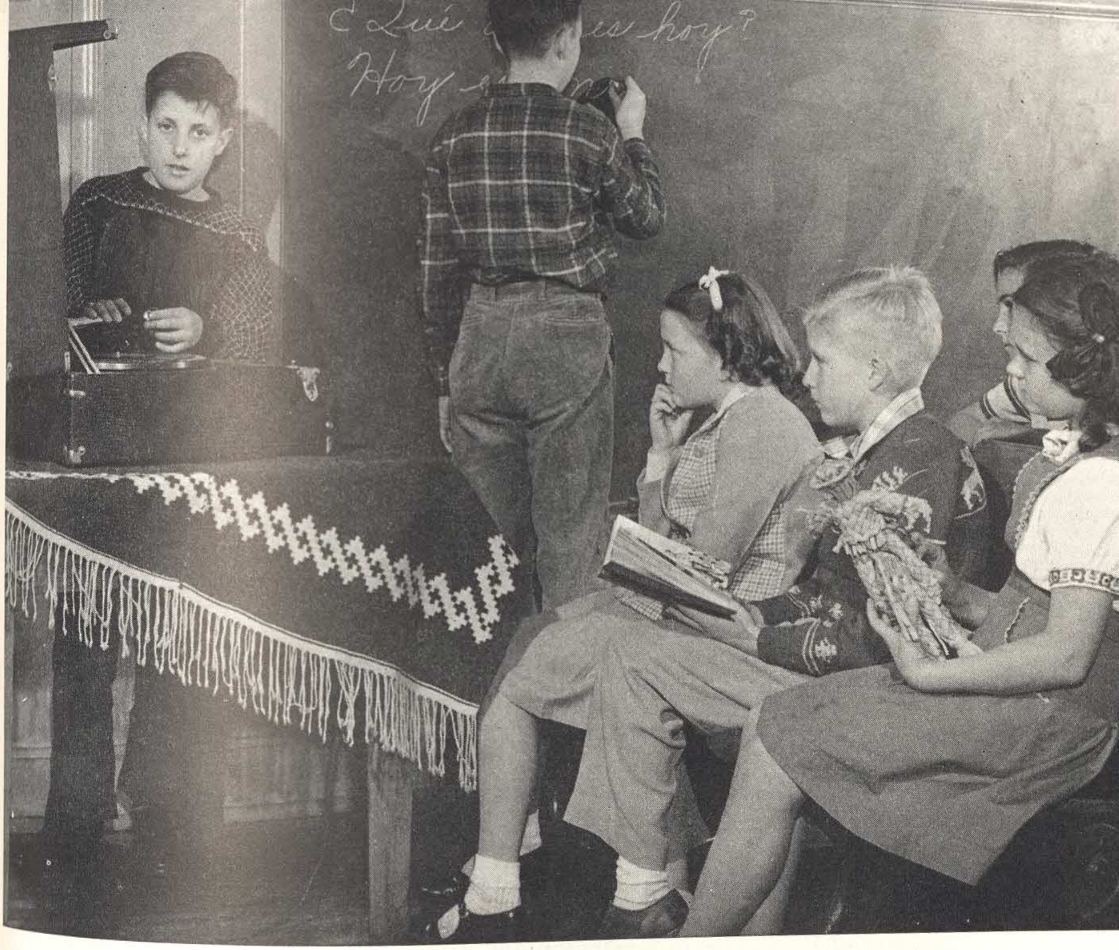
¿Qué ... es hoy?
Hoy es ...

Fig. 11.2. Learners visualize foreign-language words and phrases as they hear and imitate the recorded models spoken by a native expert. (Courtesy of Business Screen Magazine.)

appreciation of the importance of the Panama Canal and of the difficulties that had to be overcome by the men who built it.[9]

The teacher is told more about his responsibilities as the audio-guide continues:

> The class should be prepared for listening if students are to receive full value from the recording. They should know why they are listening and what they are listening for. Suggestions given here and in the next section, pre-listening activities, will help prepare students for the transcribed lesson. You may want to use part or all of the suggestions depending upon how much background your students already have. And remember, if you miss any part of the audio-

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[9] School Guild Theater Series, "Dividing a Continent," 33⅓ r.p.m., Training Aids, Inc., 7414 Beverly Blvd., Los Angeles, Calif.

guide, you may repeat it by simply returning the needle. Now here are some of the names of people and places that will be mentioned in the dramatization. We will give them slowly so that you may write them down:

> Colonel George W. Goethals. Spelled G-o-e-t-h-a-l-s. Webster's pronunciation is gō′thălz. Colonel George W. Goethals, "W" for Washington.
> President Theodore Roosevelt (repeated).
> Ferdinand de Lesseps (repeated). The French engineer who built the Suez Canal and later started the Panama Canal.
>
> Some of the places which will be mentioned are:
>
> The Isthmus of Panama.
> Culebra Cut, now called Gaillard Cut.
> Gatun, the name of a town, a lake and one set of locks.

You may want to put these words on the blackboard so that the class can see them as well as hear them. As background for the listening, students might review briefly the geography of Panama and events that led up to America's decision to build the Canal. Some of this information is given in the first part of this drama so you will not need to spend much time in review. Pictures or slides about the Canal or Panama will add interest to the subject.[10]

There are still other suggestions for helping students get the most out of the recording. Before the story begins, they are alerted to their responsibilities by the following directions:

> Write down the questions as we read them. Here's the first question. If you can't write it down word for word, just take down the key words.
>
> From the standpoint of geography and problems in engineering, why was building the Panama Canal such a difficult job?
>
> Here's the second one: Colonel Goethals said, "The Canal will build itself, if we handle the men." Here's the question: What problems does Colonel Goethals find in handling the workmen? How does he solve them?[11]

Following these instructions the dramatization itself is played. Finally the degree to which the listeners learned is evaluated by means of a true-false test also recorded as part of the listening experience:

> Listen carefully. All set? Here we go:
>
> 1. The French company built a canal across Nicaragua.
> 2. Colonel Goethals was a United States Army Engineer.
> 3. Colonel Goethals spent much time listening to the complaints of the workmen.

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[10] *Ibid.*
[11] *Ibid.*

4. Colonel Goethals was the kind of a man who directed most of the canal work from a desk.
5. The Canal took three years to build.
6. Only a few lives were lost during the building of the Canal.
7. The project cost about $10,000,000.[12]

Essential steps in the effective use of audio-learning materials have been enumerated in the above illustrations. The teacher's responsibilities for prelistening, vocabulary study, assignments, follow-up discussion, evaluation of learning through testing, discussion, and pupil-centered follow-up activities are as important in using audio-learning materials as in any other learning experience.

SOURCES OF RECORDS AND TRANSCRIPTIONS

Recorded materials for the classroom are available in three forms: the 78 r.p.m. record, the 33⅓ r.p.m. transcription, and the magnetic tape recording.

Recorded learning materials may be created as original audio experiences designed specifically for school use, as transcriptions of school radio programs, or as on-the-spot records of events useful in formal learning situations. Records of each type are released daily and constitute an ever-increasing source of valuable material for school use.

In some cases, educational recordings are available from state boards of education. For example, because school radio broadcasts cannot reach a large section of the state, the Minnesota Department of Education experimented with magnetic tape recording as a means of making audio materials of instruction available to over 3000 schools in the state. Since magnetic tape was found to be a high-fidelity, low-cost, and mechanically efficient recording medium, it was made the basis of the recording plan announced by Minnesota in 1949. Under this plan, dozens of specific broadcasts have been transcribed on tape as master copies, and from them any school in the state may make a duplicate to be retained permanently in its own collection.

A similar service to that provided in Minnesota is now offered by WHA, the University of Wisconsin state radio station at Madison; by the U.S. Office of Education Record and Transcription Service;[13] and by increasing numbers of commercial audio-educational materials distributors.[14]

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[12] *Ibid.*

[13] *Catalog of Radio Recordings, a Transcription Service for Schools,* Federal Radio Education Committee with coöperation of Office of Education, Washington, D.C.

The source list on pages 549–554 shows the variety of recorded educational materials now available that may be secured through purchase or on loan. Among them each teacher will find proved and educationally effective records and transcriptions for his subject responsibility.

SELECTING PLAYBACK EQUIPMENT

Perhaps one problem still confronting the teacher is to persuade the proper officials to buy the kind of machine and materials that will make it possible to provide worth-while audio experiences in his classroom. Fortunately many good playback machines are on the market today.

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[14] *Voices of Yesterday*, Educational Services, 1702 K St., N.W., Washington, D.C. This is a list of educational recordings on magnetic tape. The titles include "Grover Cleveland," "William McKinley," "Thomas Edison," "Woodrow Wilson," "Jane Addams," and "Marconi," among others. This is a new development in releasing earlier 16-inch 33⅓ r.p.m. transcriptions in tape form; the cost is $4.50 per 15-minute program.

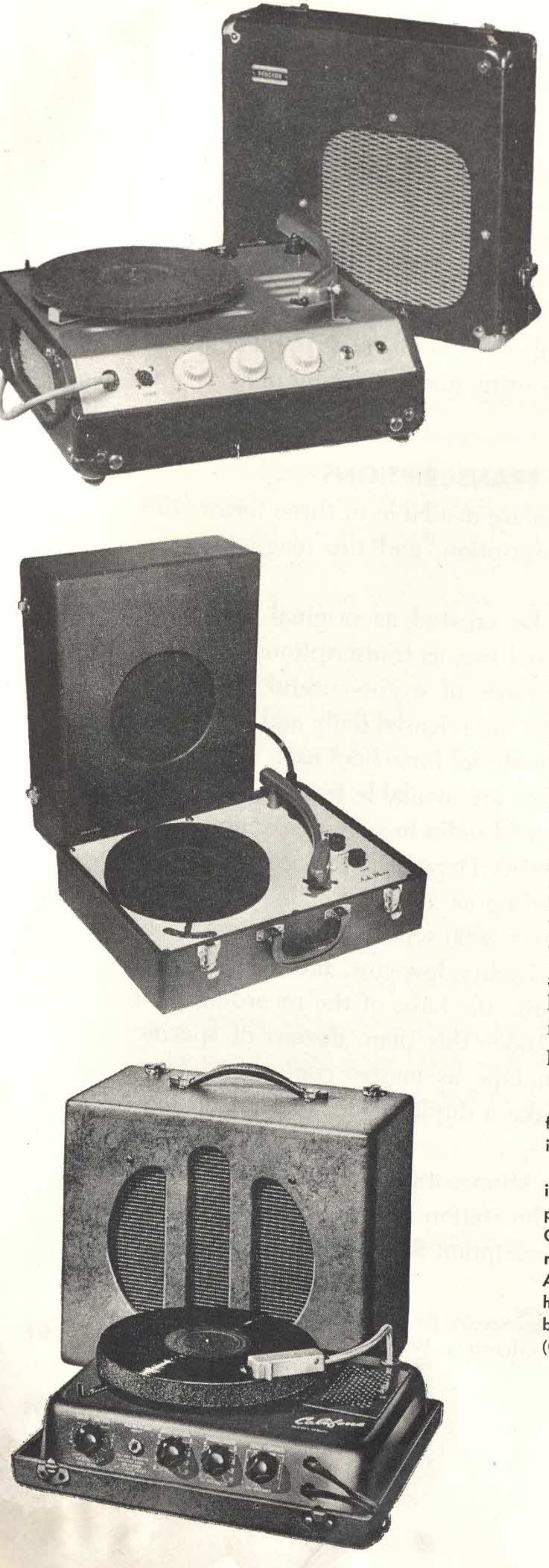

Fig. 11.3. Playback equipment is designed for the variety of uses called for in a classroom in terms of the school's budget ability.

Top: **Newcomb Dual Speed 78–33 playback incorporating simplicity and efficiency with low price. (Courtesy of Newcomb Audio Products Co.)** ***Center:*** **Audio-Master for 33, 45, and 78 r.p.m. records up to 17¼ inches. (Courtesy of Audio-Master Corp.)** ***Bottom:*** **Califone, which has three speeds and allows for above- and below-normal turntable speed corrections. (Courtesy of Califone Corporation.)**

Even casual acquaintance with recording equipment shows that a two-speed turntable, 78 and 33⅓ r.p.m., is desirable. Listening to records or transcriptions as they are being played provides an opportunity to detect noises in the mechanism proper, or surface sounds which interfere with audibility. A good turntable operates without sounds or noises which will compete with the material being played.

Consideration should be give to the reputation and service facilities of the dealer from whom the playback equipment is purchased. Reputable dealers are only too anxious to demonstrate what well-constructed, high-quality record players can do. Aside from this, the price of the equipment may be the determining factor. Most important of all, however, is the reputation of the dealer for giving prompt service and for guaranteeing the quality of the equipment he is selling to the school. Typical playbacks are shown in Fig. 11.3.

THE LISTENING ENVIRONMENT

The use of audio instruction materials should be possible in the usual classroom. Seating arrangements should be flexible. The speaker should be moved away from reflecting surfaces such as large table tops and bare walls. Wall surfaces which cause undue reflection of sound should be covered with acoustical material or draperies. The speaker should be placed so that an imaginary line could be drawn from the center of its face, and at right angles to its surface, directly to the ears of most of the listeners. This means that the children should sit as directly as possible in front of the speaker. Experimentation will indicate the best place for it.

CARE OF RECORDS

Mechanical improvements have been built rapidly into school playback equipment. The old-time, heavy pickup arms which did great harm to records, particularly the softer vinylite type, have been replaced by improved, high-fidelity tone arms which barely brush the styli across the surface of the records. The teacher should make sure that the pickup arm is placed on the record very carefully each time it is played. The needle or stylus should never be dropped on the delicate surface of the record, for this will cause damage and produce a "clacking" sound when the record is played.

Recorded materials are likely to pick up dust. Since this produces abrasion, records and recordings must be kept clean. A record brush made of hair should be obtained and the surface of the record should be brushed before each playing. The simple fact of handling records by grasping the outer edge instead of putting the entire hand on the surface will keep dust, fingerprints, and lint from the surface. Care in handling and using records and transcriptions will give a higher quality of listening materials over a longer period of time.

EVALUATION

The use of educational recordings in teaching is justified only when greater reality, interest, vividness, authenticity, and learning result because of them. In each area of school work, audio materials must be evaluated in terms of such outcomes. Hence it is desirable that, following a recorded learning experience, the teacher and pupil evaluate what has happened. Since using recorded materials of instruction is very similar to using radio in the classroom, the questions on page 277 are applicable for evaluation. The following, however, are specific criteria for evaluating by both teacher and pupil.

For the Teacher

1. Did the recorded material provide learning experiences which could not have been provided more easily with traditional materials?
2. Am I acquainted with all the sources of audio materials in my subject area?
3. Did I carefully preaudit the material I used?
4. Did I give attention to such factors as acoustics, seating arrangement, location of the speaker, and volume, while the record was being played?
5. Did I adequately prepare students for this listening activity by:
   a. Outlining vocabulary problems?
   b. Telling them what they were expected to accomplish?
   c. Encouraging discussion in which they could show their interest?
6. Did I encourage follow-up activities such as discussion and self-evaluation through testing?
7. Did I encourage follow-up projects such as reading, simple research, creative art expression, creative dramatic expression, etc.?

For the Pupil

1. Could I hear well enough to understand the material?
2. Did I know what I was to do before I began to listen?

3. Did I contribute any ideas during the discussion?
4. Did I help plan follow-up activities?

Suggested Activities

1. Select a suitable record or transcription and use it in one of your classes. Describe (a) utilization technique employed, (b) student reactions, (c) your own reactions to the effectiveness of this teaching aid.
2. Discuss the relative educational advantages and disadvantages of the record or transcription accompanied by teaching and pupil guides (a) printed separately and (b) appearing on the disk itself.
3. Compare the way you would use records and transcriptions with the way you would use school radio broadcasts.
4. Arrange with a local audio-visual equipment dealer to examine the latest audio equipment. Report your findings to your group.

Bibliography

Bathurst, Effie G., *Phonograph Records as an Aid to Learning in Rural Elementary Schools,* University of the State of New York, State Education Department, 1943, pp. 117–137.

Catalog of Radio Recordings, a Transcription Service for Schools, Federal Radio Education Committee with coöperation of Office of Education, Washington, D.C.

Education Services, *Voices of Yesterday.*

12. Classroom Recorders

Just before the ten-minute warning bell rang, Mr. Stanton made the final adjustments on the recorder. He then arranged the room so that the students would not see the recorder as they took their seats. The microphone was well placed, but hidden.

When the period began, the students, one by one, gave what they believed were thoughtfully prepared two-minute summaries of free reading they had done the preceding week end.

As the last student returned to his seat, Mr. Stanton asked, "How would you like to hear yourselves?"

The silence was taken for assent, the recorder was brought into view, and an instant later the unmistakable sounds of the "reporters' " voices came from the recorder. There was complete silence when the listening began. Soon, knowing glances passed from identifier to identified as the "played back" reports went on.

Moments later the recorder was shut off and the teacher asked, "Well, what do you think?"

Spontaneous reactions came from every quarter:

"Was that what I said?"

"It couldn't be!"

"Mary was good!"

"I wasn't either! I stumbled!"

"I don't believe it—why I sound terrible."

"Is that really the way I sound?"

Comments came so fast that they were jumbled.

Soon a more orderly discussion got under way. Those *were* their voices. The students weren't satisfied. Something had to be done; admissions of need for improvement were unanimous. What could be done? Several students asked if they could use the recorder after school for practice and listening. Others wanted to try again. Then one of the girls said, "We should take lessons in enunciation." Another student suggested, "By listening to some of the recordings we had in history class, we could learn a lot about good speech habits."

During the next two weeks, everything suggested was tried—and more. The improvement in speech habits was noticeable.

In another situation, an instrumental music class used a recorder for self-evaluation and criticism.

A clever dramatic coach, unable to make a point clear, used a recorder so that the class play's ingénue could listen to herself. She "heard" the point and set about correcting the inflections she had been using meaninglessly.

In still another situation, the "Radio 'Casters," a group of high-school upperclassmen, used a recorder not only to rehearse and listen but to record the final productions, one of which was good enough to be broadcast over the local radio station.

RECORDING DEVICES DEFINED

There are three basic types of audio-recording devices for school use: the disk recorder, the wire recorder, and the magnetic tape recorder. In certain basic characteristics all are similar: (1) Reasonable "presence" or naturalness of tone or voice is possible with all three. (2) Immediate playback of the recorded material is possible with all three. (3) All are within the budget range of the average urban or large rural school.

But there the basic similarities cease. For each recorder has unique characteristics which make it more or less useful in a given teaching situation.

THE DISK RECORDER [1]

The oldest type of recording instrument used widely for educational purposes is the disk recorder, like that shown in Fig. 12.1. This device has a microphone pickup which converts sound waves into electrical impulses that vary with the original sound wave. These electrical impulses activate a mechanical cutting head and stylus which inscribes a groove of varying depth on the surface of an acetate- or plastic-coated blank disk. In playing back this impression, a playing head and needle convert the recorded sounds almost to the original sounds and volume modulations.

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[1] Sources of disk and other types of recorders are listed on p. 549.

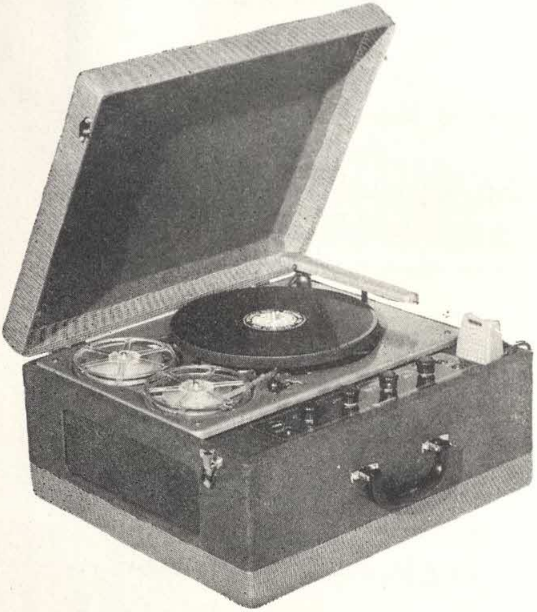


Fig. 12.1. The Wilcox-Gay disk recorder is very versatile. Recordings may be made directly on tape from the microphone or from a radio, and also from phonograph records. Recordings may be made from tape to disk or from radio or from microphone to disk. The instrument operates at a speed of 3.75 inches per second; its double channel recording feature permits recordings up to one hour in length on a 5-inch reel of tape. (Courtesy of Wilcox-Gay Corporation.)

The school-made disk recording resembles commercial records somewhat and usually can be played back on any 78 or 33⅓ r.p.m. turntable.

Disk recording offers the ingenious teacher a variety of opportunities for use. In a group working on reading, each child was allowed to record his oral reading on a 6-inch plastic-coated 78 r.p.m. disk. He wrote his name, age, and other identifying information on the paper label at the center of the disk. After he listened to the recording and used it to help him improve his expression, enunciation, etc., each child took his record home as a "report" of progress. The parent's pleasure in hearing his child's reading progress report on the home record player can be imagined.

During recording, care must be taken to see that the cutting head stylus is sharp and well adjusted. The "cuttings" or small threads of what is cut out must be carefully removed while the recording is being cut, for otherwise they may bunch up in front of the stylus and impair the quality of the recording.

Disk or acetate recording is not a permanent record and should not be so used, for repeated playing of these records causes needle "wear" which ultimately affects the quality of the original recording.

THE WIRE RECORDER

The wire recorder (Fig. 12.2) is a compact recording device which instantaneously records a sound impression on a long strand of fine wire. It makes possible continuous recording of from thirty minutes to several hours. In many recorders two levels of fidelity can be achieved by changing the speed at which the audio image is recorded on the wire. The faster the wire moves through the machine, the better the quality of the recording is likely to be.

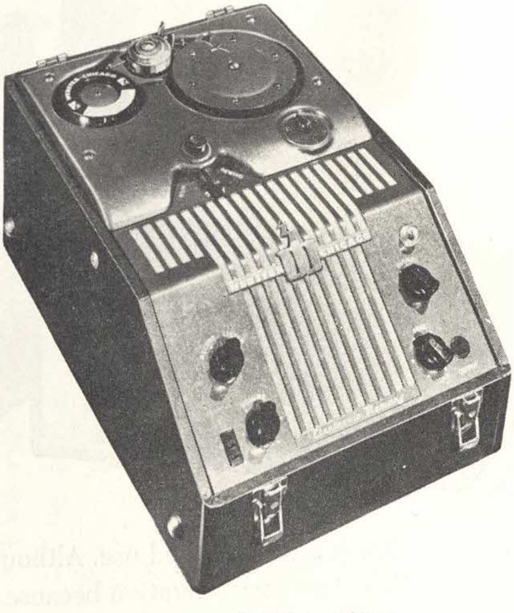


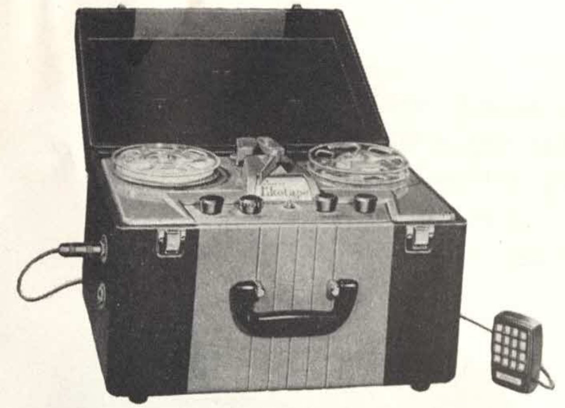
Fig. 12.2. (Courtesy of Webster-Chicago Corporation.)

In the wire recorder a microphone converts sound waves to electrical impulses which excite a soft iron magnet. This magnet transfers signals of varying intensity to the wire as it passes through the recorder. Reversing the whole process makes instantaneous playback possible.

The wire recording can be used for repeated playbacks. When the original recording is no longer needed, the magnetic pattern can be erased by running the wire over an "erasing head." Hence the wire can be used again and again.

The classroom use of wire recorders is fairly recent. However, wire recording offers many advantages to the teacher. (1) *It is flexible.* School programs can be recorded in their entirety; recitations can be recorded and analyzed, and then saved or erased. (2) *Wire recording is inexpensive.* The low cost of operation permits teachers and administrators to record lengthy programs, uninterrupted audio evidences of school work, or complete related series of speech, music, or sports events. (3) *Wire recording is mechanically convenient.* Its light weight and relative simplicity of operation tend to make the wire recorder an instructional device valued by the creative teacher because of the confidence he knows can be placed in this convenient instrument.

But there are some disadvantages. Wire loses its pliability and tends to



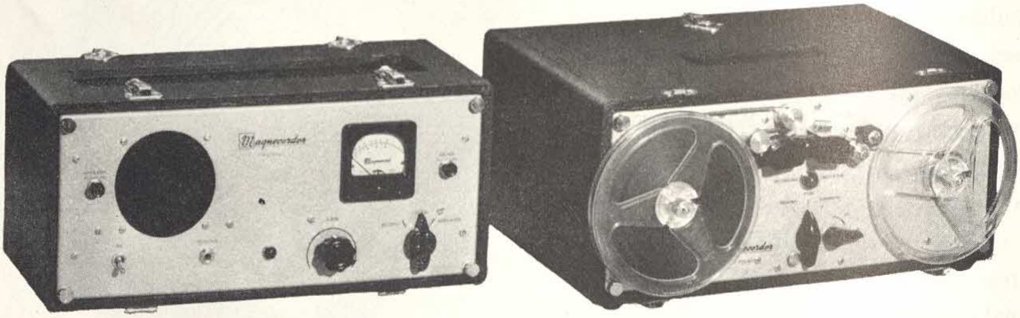


Fig. 12.3. These tape recorders represent two of a wide range used in classrooms. The price is almost directly proportional to fidelity. (*Top:* courtesy of Webster Electric Company; *bottom:* courtesy of Magnecord, Inc.)

break after repeated use. Although the wire can be retied or spliced, this is not an easy operation because of the tangle of wire which must first be unraveled. Moreover, a recording made on one machine cannot always be played back on a machine of another make. The magnetic heads occasionally get out of adjustment.

In spite of these disadvantages, however, the wire recorder is an extremely versatile high-fidelity instrument.

THE TAPE RECORDER

The latest recording device to appear in the classroom is the tape recorder (Fig. 12.3). This recorder is similar in some respects to the wire recorder in that a magnetic signal is used to capture the audio image. But instead of the magnetic pattern being put on wire, metallic-coated plastic or paper tape is used for this purpose.

When a tape recording is made, sound waves are picked up by a microphone and instantaneously converted into a series of varying electrical impulses. These impulses travel to a small magnet which touches a moving ribbon of metallic-coated tape. This coating receives and retains magnetic impressions of varying strength which correspond directly to the original impulses set up by the sound waves of voice or music (see Fig. 12.4).

The tape can be rewound and played back at once. The invisible magnetic impressions excite the magnetic head and create electrical impulses which, after being suitably amplified, activate the loud-speaker diaphragm to produce sound waves identical to those originally set up during recording.

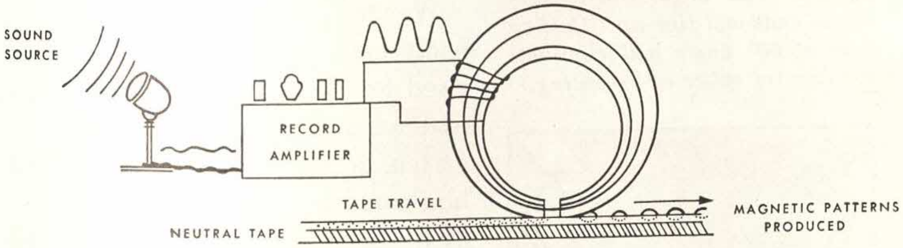


Fig. 12.4. (This and Figs. 12.5–12.7 courtesy of Minnesota Mining & Manufacturing Company. Makers of "Scotch" Sound Recording Tape.)

Tape recordings can be used again and again. A reel of tape was run more than 3000 times without any visible evidence of wear or any decrease in the fidelity of the sound.[2]

If, on the other hand, an error has been made or the recording is no longer needed, the magnetic image can be erased in a matter of seconds. Erasing makes the tape magnetically neutral and the tape is then ready for immediate reuse for other recordings.

The tape recorder is a highly flexible teaching tool that can be put to many varied and unique uses. A guidance director reports using tape for anecdotal records which are "filed" in the student's cumulative record folder. At one-year intervals the tape-recorded student reports and interviews are spliced end to end (Fig. 12.5) and wound around a flat cardboard "reel."

"Teachers," this director says, "are very willing to stop by my office, and as if they were chatting with me, record their comments on tape, knowing that I will add their 'tape' report to the progressively growing information record of a given student. At the time of graduation or on any occasion for listening, the tape record can be played back for parents, teachers, or pupil to listen to."

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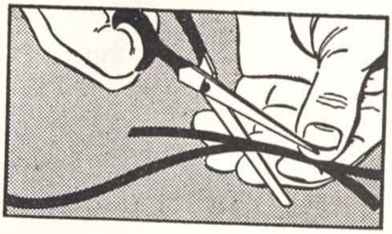
[2] R. C. Brower, "Tape Recordings for Teaching," *Educational Screen*, February, 1950, p. 62.

We are just beginning to realize the many important uses that can be devised for the tape recorder. Suppose that when Johnny comes to kindergarten, a simple conversation with him could be recorded. Suppose that as he goes from grade to grade, his oral speech habits, oral reading, and conversations revealing his interests, likes and dislikes, ambitions, and relationships with home, school, and friends could be captured on tape, placed in his record folder, and on graduation be spliced together as an audio document of his school life and progress. Imagine the interest of his parents, and possibly an employer, in such a document.

In teaching shorthand there is frequent need to test a student's ability to take dictation at a given level of difficulty and a given speed. What better way to insure timing accuracy and uniformity, when repetition is needed, than to record the test on tape? It can be played back immediately for discussion or further practice.

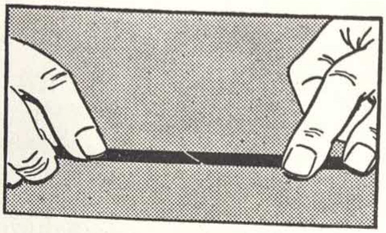
Here's how to make tight, noise-free splices:

1.



Cut tape at 60° angle with an overlap so ends will line up. (Cutting tape at 60° angle will eliminate detection of splice on recording.)

2.

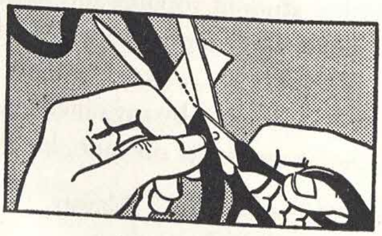


Align both ends of tape, uncoated side up (shiny on plastic, grey on paper.)

3.

*Cover aligned ends with "*SCOTCH*" Splicing Tape, evenly and securely.*

4.



Trim off excess splicing tape. (Cut into the recording tape backing very slightly as illustrated by dotted lines. This eliminates possibility of a sticky splice.)

Fig. 12.5.

Fig. 12.6.

Letters recorded on tape by local businessmen have been used in shorthand classes to bring variations in voice, speed of dictation, mannerisms, and enunciation into the practice sessions. This recorded dictation gives students practice in taking dictation under conditions similar to those they will find in actual jobs.

Another illustration is the following report by a teacher:

> In our club activities we conducted business meetings. We took a recording of our meeting and compared it with a recording of the Student Council Meeting. It helped to improve our own order of business. We also had an opportunity to hear if our representative to Student Council was taking part in their meetings. Because of the record of our own meeting, we were able to judge how many in our homeroom were expressing their opinions and to discover the general co-operation of the members. The group was motivated to work for improved procedure, better attention, and greater effort.[3]

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[3] R. M. Petersen and Raymond Petrie, "As Others Hear Us," *See and Hear*, May, 1949, p. 30.

In a large urban high school the confusion and noise in the halls were reaching unwarranted levels. The student council decided to act. Quietly but with great effectiveness they recorded typical hall and stairway noise while classes were changing. The recording was played back at the next meeting of the council and they were asked: "Do we want this in our school?" As a result the recording was played at the next school assembly and the same question was asked. A month later another recording was made—the reduction in noise was amazing.

The recorder offers unlimited opportunities in foreign-language study.

> Teachers are currently using the machine to help the students get acquainted with the sounds which are peculiar to the language, one of the main concerns of modern language study. What better suggestion for improvement can the student be given than a chance to hear his own pronunciation as compared with the native tongue?
>
> My students had fallen into rather careless habits of reading Spanish. Their pronunciation and enunciation were careless but the chief difficulty was in phrasing. A number of them read sentences and paragraphs as though reading a list of words with about as much expression as they would read a grocery list. A recording was made and the students were horrified with the flat, monotonous, lifeless voices they heard. They realized, I believe, for the first time that merely pronouncing the words correctly and going at a fair rate of speed was not enough . . . that much more was desired.[4]

The tape recorder gives a nearly permanent record. Contrary to older and less effective types of recording instruments, the tape recorder is a medium for relatively permanent recording. Although tape recording is still in its infancy, it is the best available means of capturing and retaining wide ranges of sounds. There is little appreciable loss even with thousands of replayings which would bring destruction to other recording mediums. The truth of this is evidenced by the wide swing of commercial radio stations to tape recordings.

The tape recorder is a flexible, easily operated mechanical recorder. Tape recorders are easy to operate and convenient to transport. The tape itself is inexpensive and durable. It can be readily edited. Thus, on a given recording the tape can be cut, lengths of it rearranged or omitted as desired, and the cut ends easily spliced.

Tape recording has yet to become standardized in terms of the size of reels and the speed of recording. At present there is no assurance that a

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[4] *Ibid.*

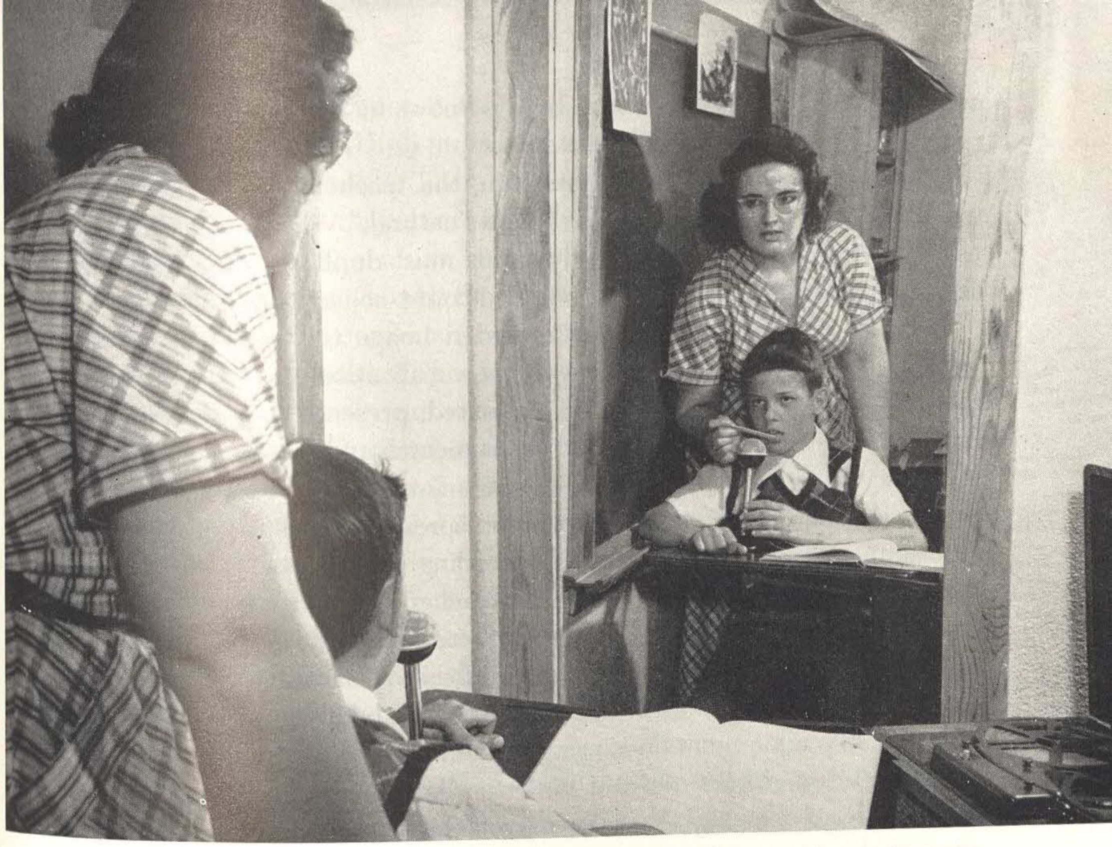

Fig. 12.7. The tape recorder can enable the pupil to hear himself, evaluate his efforts, and improve his performance. Now he can hear himself as others hear him.

tape recording made on one model or make of machine will either fit or "play" on another. Furthermore, the sound head is subject to mechanical fault, as is the case with other recording devices.

By using his imagination, the subject specialist can create valid and effective opportunities for recording in instruction far beyond what can be mentioned here. Thus the guidance director can help the prospective job applicant anticipate his role; the home economics teacher, the dramatics and speech teacher, the athletic coach, the remedial reading expert, and the teacher of instrumental music—all will welcome the possibilities which this new tool for instruction offers.

ACHIEVING PRESENCE IN RECORDING

With the invention of each new instructional device the teacher assumes added responsibilities. He must learn new techniques when he uses audio-recording equipment, but he knows he will be well rewarded in terms of increased pupil achievement.

In using a recorder in the classroom, the teacher is concerned with whether the playback sounds "real" and "natural." When the recorder is used for evaluation, the recorded sounds must duplicate the original as completely as possible; in other words, it must achieve "presence."

Presence or lifelikeness in the recorded image is essential if the recorder is to be used in school work. If the vocalizations of students, either word of mouth or song, are to be evaluated, presence must be attained in recordings. If choral work and instrumental and orchestral arrangements are to be evaluated, if music is to be analyzed in terms of timbre, pitch, intonation, volume, or expression, presence must be attained in recording. Attaining naturalness in recording is not so technical a problem that it is outside the ability of the teacher.

The teacher will soon discover that there is more to using a recorder than merely putting a microphone up in front of an individual or group. To attain presence, he must know something about the microphone or sound pickup equipment he is using. In addition he must understand the opportunities and limitations of his own classroom. We shall attack the problem by discussing the selection of the microphone and its most effective location.

Usually, in acquiring a recording system, the first impulse is to buy the microphone, speaker, and recorder as a unit. In many cases the manufacturer has carefully balanced all three units of the equipment. In some cases, however, where competition makes price a factor, the microphone itself is frequently the poorest unit of the entire setup.

The microphone used in classroom recordings should be as nearly as possible like those used in professional radio broadcasting. A good microphone may cost from $50 to $100. Crystal or high-impedance microphones generally are not satisfactory.

Microphones now available may be divided into three groups: (1) nondirectional, (2) bidirectional, (3) a combination of these two types. The teacher who is attempting to record group projects such as choral verse or music will soon discover that one microphone is not enough to attain the naturalness or presence desired. It may be wise to use two—a nondirectional and a bidirectional.

In selecting the microphone the teacher should inquire as to whether the length of cable between it and the recorder will alter the quality of the microphone itself. High-impedance microphones can be used with only about 25 feet of cable. There is less limit to the length of cable that can be used with low-impedance microphones without loss of quality or volume.

In placing the microphones, the teacher is at first likely to depend on his own hearing. He does not realize that sound heard by two ears is entirely different from that "heard" by a microphone. Our ears possess the ability to concentrate our attention on the one person who is talking to us even though the room is filled with chatting people. We have trained ourselves to disregard extraneous sounds. The microphone, on the other hand, is monaural—as if one ear were listening and that ear made no discrimination. Every sound that reaches it is picked up. Not so with the human ear.

To test this, place a microphone in a room in which a crowd of people are talking freely with one another; record the sound. The result will be a jumble—a completely indistinguishable jumble. As a further test, while speaking to a person in the presence of others who are also talking, put your hand over one ear and note how his voice suddenly fades away and mixes with the other sounds in the room. Hence it is important to remember that *a microphone has no power to differentiate between sounds.*

In placing the microphone, move around to various spots and listen with one ear. In this way you will hear much as a microphone does. Thus you will be able to judge what it will "hear" and accordingly place it to best advantage.

While you are deciding where to put the microphone, roughly divide the space that will be occupied by the speakers and performers into five or six imaginary squares. Put the microphone in the center of each of these squares and test the results on the recorder. You will soon become exceptionally good in judging about locating the microphone.

The acoustics of the room or recording area should be studied. Ordinarily the microphone should be located a good distance away from reverberating surfaces. Corners of the room should be avoided, as should also proximity to hard, flat surfaces.

You can soon distinguish between a "live" room and what is known as a "dead" room. Unfortunately, most teachers have to contend with classrooms which have poor acoustics. The usual classroom is "live," characterized by hard plaster wall and ceiling surfaces. A "live" room is likely to be filled with reverberated or echoed sound waves which cause confusion as they enter the microphone. Such a classroom can be made less "live" by drawing the shades, or, if there are draperies, spreading them out over as large an area as possible. Wall hangings, cloth-covered screens, and other surfaces which can be hung temporarily with sound-absorbing material will also help remarkably.

In contrast to this is the "dead" room. Such a room may be crowded with rugs, draperies, and overstuffed furniture, and its ceilings and walls may have good acoustic properties. Here, however, there is an undesirable amount of sound absorption which results in "hollow barrel" recordings. Once simple trial and error has revealed the sound-reflecting surfaces, the hollow recordings can be avoided by placing the microphone properly.

After the acoustic properties of the classroom are known, recommendations may be made concerning the bettering of poor acoustics. In rooms which are too live, thick acoustic tile may be installed on the ceiling. Usually this is sufficient, but sometimes additional panels are needed on one or more walls. In rooms which are too dead—this is the exception—drapery materials may be removed or some acoustic tiles removed.

SELECTING AND PLACING THE LOUD-SPEAKER

In many cases school-owned sound-recording equipment does not include good loud-speakers. Loud-speakers are usually effective in terms of the diameter of the reverberation cone, but there are exceptions to this.

Exceptionally small speakers, 3 to 5 inches in diameter, which are an integral part of low-cost equipment, are apt to sound tinny and rigid because they cannot reproduce the complete range of the sound waves originally recorded on the wire, tape, or disk. Most of the larger loud-speakers which are used with sound motion-picture equipment can be adapted to a recorder. Since sound motion-picture projectors usually have 10- or 12-inch speakers, the quality of the sound is in most cases much improved. A speaker which is mounted separately in its own box or chassis is preferable, when possible.

A good speaker is really two speakers in one. One part delivers the low sounds ranging from 150 to 1500 cycles per second. The other part is used for sounds above this; they range as high as 10,000 cycles.

By listening to a loud-speaker in action, you can judge its efficiency. Ask yourself how near the original the sounds seem. Can you hear high-frequency sounds? There is usually no difficulty in hearing very low-frequency sounds because they are easily reproduced regardless of the size of the speaker.

A GUIDE FOR SELECTING RECORDING EQUIPMENT

In order to assist the teacher who is to select recording equipment, the following list of questions is offered. Rather than becoming proficient in the physics of sound himself, he should ask such questions of the dealer or distributor from whom the equipment is secured. The answers to the questions below should be "yes."

Characteristics to Be Considered

1. Is the microphone a low-impedance, nondirectional type?
2. Can a second or even third bidirectional microphone be added to the recorder proper?
3. If a small speaker (4- or 6-inch cone) is built in the recorder, can a larger one (10 or 12 inches) with a wider reproduction range be plugged in?
4. Is the drive mechanism powered by a constant-speed motor?
5. Does comparison show that the recorder you selected gives maximum ease of operation?
6. Is the recorder light and compact so that it can be carried reasonably easily?
7. Can the dealer guarantee the mechanical operation of the recorder?
8. Does the dealer guarantee overnight repair service?
9. Will the dealer teach you all you need to know about operating the equipment and placing the microphone?

SUMMARY

Today it is possible for teacher and pupil to hear themselves as others hear them. The recording instrument has as many uses as the ingenious teacher finds need for. By means of recordings he can secure instructional control, evaluation, and analysis in a degree heretofore impossible.

The recorder is well adapted for work in speech, in evaluating and improving diction, voice, intonation, enunciation, and general speech patterns of learners. It is invaluable in the field of foreign languages, where mimicry is often the means of improving pronunciation. In reading and in extemporaneous discussion on the part of both teacher and pupil, recording offers many possibilities.

In music, whether it be individual performance, string trios, quartets, double quartets, or full orchestras, the recording can become an inspiring and realistic means of evaluation, instruction, and improvement. Individual and group performance—vocal, choral, and instrumental—can be judged, discussed, and ultimately improved by means of recordings. The recorder is of value in teaching regardless of grade level or subject area. The extent of its use depends on the teacher's understanding of the basic characteristics of the technique and his insight into the never-ending opportunities thus made possible.

Recorded dramatizations, interviews, and reports can go beyond the school to the community, as oral reports of progress for community groups, service clubs, and parents.

In selecting recording equipment, the teacher should consider the quality of the microphone and speaker, the ease of operation and maintenance, the motor, and above all the ease and speed with which the recorder can be repaired when something goes wrong. The carefully selected, effectively maintained, and wisely used sound recorder can become a valuable part of the classroom equipment.

Suggested Activities

1. As a teacher in training, quietly and unobtrusively set up a sound recorder just before you begin your work in a practice class. At the end of the class, take the recorder into your study and listen privately to your own reactions; analyze the interest your voice has, the care for enunciation you showed, and the quality of the class discussion which your preparation and leadership brought forth.
2. As an experienced teacher, set up a recorder in any normal classroom situation. Later, in private, listen to the playback and ask yourself such questions as these: Is my speech pleasant? Is my enunciation clear and understandable? Is my manner toward children pleasing? Can I learn anything from the children's responses to my questions and leadership?
3. As a teacher, anticipate the problems in language arts, music, or general learning that will arise next week, and make plans for handling them; use the tape recorder.

4. List the ways in which you feel that the use of a recorder may be important to your colleagues who are not now using one.

Bibliography

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THE ALL INDIA COUNCIL FOR SECONDARY EDUCATION
4/19, Asaf Ali Road,
NEW DELHI

13. Still Projection

The film had just ended. The lights came on. A hum of conversation arose, chairs moved, the class began coming back to the present.

"Gee, that was a good film!"

"Javert certainly was a louse, wasn't he! I'd have shot him if I'd been Jean Valjean."

"The poor people didn't have much chance in those days, did they?"

The bell rang at this point and the class left the room, still talking about the absorbing film they had just seen.

The next morning after the social problems class assembled, the teacher picked up the discussion with a few questions about the life and times of Jean Valjean as shown in the feature film *Les Misérables*. It soon became evident that the pupils' impressions varied considerably on some points.

"Perhaps this filmstrip will help us to remember some of the key scenes," said the teacher, switching on a small projector containing a Discussionstrip[1] (Fig. 13.1) based upon the film. The familiar scenes before them enabled the pupils to focus the discussion more sharply.

"Observe the direction of pressure flow indicated on this diagram," said the science instructor, turning a knob that pointed a small electric arrow at a particular spot on the screen.

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[1] "Discussionstrip" is a trade name for filmstrips on feature films.

"This is an illustration from a new magazine article on turbo-jet engines. It contains the most helpful explanation and pictures on the subject that I have come across. Now here you see . . ."

What kind of projector enabled this instructor to project for his physics class good illustrations, like that shown in Fig. 13.2, directly from a current magazine?

As the children settled into their little circle of chairs, Miss Miller started discussing a subject they had been talking about for several days in their reading class.

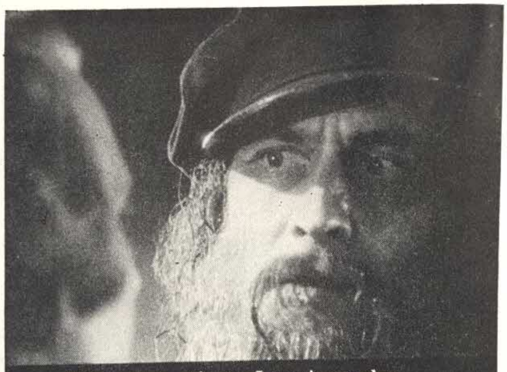
"Now, children, what did we see with Peter and Susan yesterday on their grandfather's farm?"

"We saw their grandfather," said Fred. "A cow," said Mary. "A sheep and some pigs," said a third youngster. "There were little pigs and big pigs," volunteered another. Eager responses came tumbling out from most of the boys and girls.

"Now, what were we about to see with Peter and Susan when our reading period ended yesterday?" Again there was a flurry of hands. Miss Miller called on Joanne, a shy little girl.

"We were going to see the barn," said Joanne.

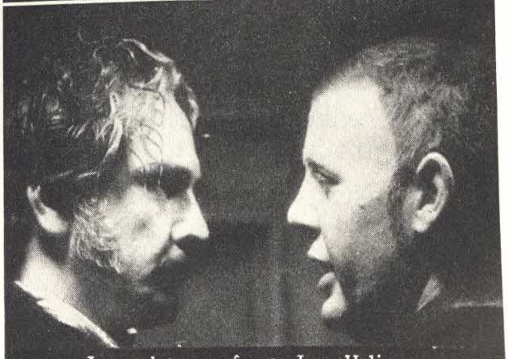
"Yes, Joanne. I wonder what the



"How do you know I won't murder you in the night?"

"Let me give. In turn, promise me you too — will give."

When Jean tries to save Marius, he is followed by Javert.



Javert later confronts Jean Valjean to arrest him.

Fig. 13.1. Filmstrips help stimulate follow-up discussion on feature films. (Courtesy of Films Incorporated.)

barn will look like. Who has seen a barn and can tell us what it looks like? What is inside?"

Miss Miller went to the chalkboard and wrote the words BARN, RED, BIG, HAY, COWS, HORSE, and a few others as they came up in the children's discussion.

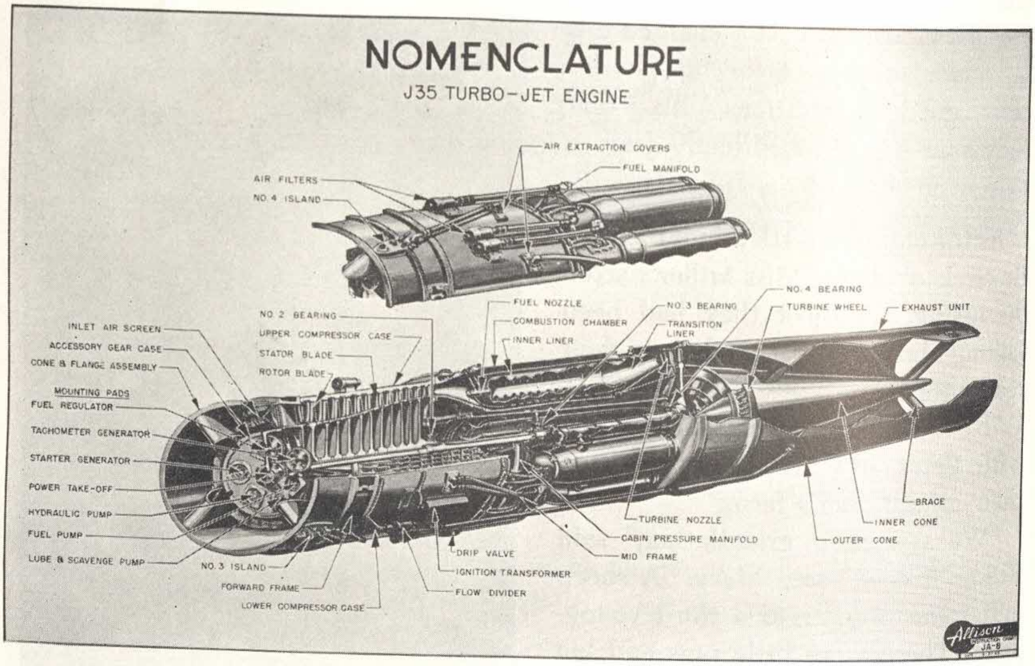


Fig. 13.2. A great variety of materials can be projected effectively with an opaque projector. (Courtesy of General Motors Corporation.)

"Now shall we see if we can find all these things with Susan and Peter when they go to their grandfather's barn? Fine. And maybe we'll find some other things too. We'll look very closely, won't we?"

"Very well. Who would like to close the shades? Jack and Joanne. And you may switch off the lights, John."

Thus the stage is set by one primary teacher for an exciting adventure which will give pleasure to her pupils and explain several new concepts to them. Later in the spring she will take them to visit a real farm. Meantime, however, she makes good use of a color filmstrip that is correlated with one of their books in natural science.

Next week a motion picture is scheduled which will give additional new meaning to life on a farm in the spring. At the moment, however, this teacher wants to present the meaning of new terms at the children's own rate; hence she uses a filmstrip so that each picture may be discussed as long as necessary. What other advantages might a filmstrip have in comparable teaching situations?

FILMSTRIPS

TERMINOLOGY

A variety of names have been used for filmstrips, among them "stripfilms," "slidefilms," "filmslides," and "still films," besides various trade names. There appears to be no particular advantage or purpose in this diverse terminology. On the contrary, it probably creates unnecessary confusion about a valuable teaching tool.

Audio-visual publications give evidence of a commendable tendency to standardize this terminology in the word "filmstrip."[2] The present writers are in accord with this tendency and accordingly the designation "filmstrip" is used throughout this book.

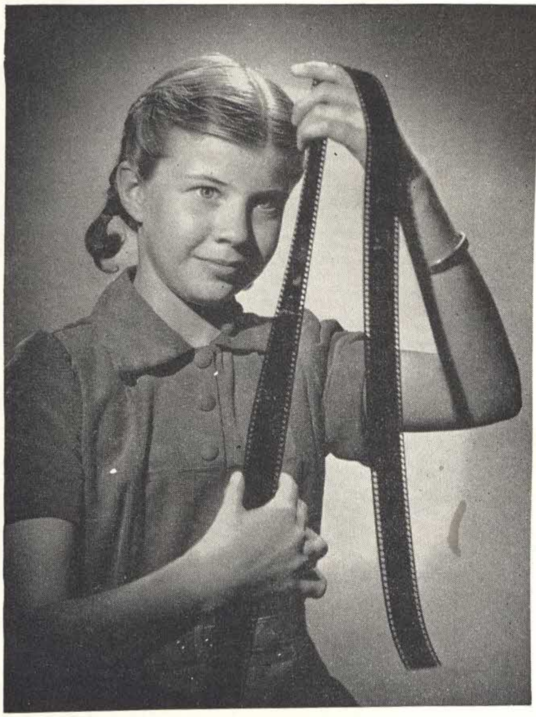


Fig. 13.3. A single-frame filmstrip. Each filmstrip presents a story in still pictures. (From *Specialization*, courtesy of General Mills, Inc.)

PHYSICAL CHARACTERISTICS

A filmstrip is a related sequence of transparent still pictures or images on a strip of 35 mm. film (Fig. 13.3). The pictures may be silent or sound, in color or black and white. They may be single or double frame; a single frame is approximately ¾″ x 1″. Most commercially produced filmstrips are single-frame pictures. It makes little practical difference to the teacher whether single- or double-frame filmstrips are used, for usually the same projector can be used for both.

A filmstrip typically contains from 20 to 50 frames, although it may have more. A complete filmstrip is from two to five feet in length, and is easily rolled up to fit into a small metal container (Fig. 13.4). Filmstrip containers take up little space and can be stored readily. The cost is low enough so that it is quite feasible to keep sets of filmstrips in each classroom for use when needed.

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[2] Vera Falconer, *Filmstrips*, McGraw-Hill, New York, 1948, p. 8.

Some filmstrips are accompanied by records. Such a filmstrip is called a *sound filmstrip*. The record usually carries narration and may also include appropriate music and sound effects.

Fig. 13.4. Filmstrips may be filed in a compact container, and hence easily located when needed. (Courtesy of Neumade Products Corp.)

An audible signal on the record indicates when the next frame should be shown. There is also a record that has an inaudible signal which changes the frames automatically; this requires a special projector. Otherwise a separate filmstrip projector and record player can be used (see Fig. 13.5), provided the speed of the playback is correct for the records.

Record speeds are either 33⅓ or 78 r.p.m. There is an increasing tendency to use 33⅓ r.p.m. records with sound filmstrips because fewer records are necessary and hence there are fewer interruptions because of changing the records. A 12-inch 78 r.p.m. record plays approximately five minutes per side, and a 16-inch 33⅓ r.p.m. record plays fifteen minutes per side. A school with dual-speed record player and a filmstrip projector can use most of the sound filmstrips that are now available.

Sound filmstrips are chiefly valuable in providing standardized instruction. Such instruction is desirable for certain technical and industrial processes such as the assembly of a carburetor or the teaching of recommended sales techniques. The sound filmstrip has accordingly been extensively used in industrial and military training programs where uniformity is of primary importance.

For school use, sound filmstrips have frequently been found more satisfactory when the record is turned off and the teacher or a student provides the "sound." This procedure preserves one of the principal advan-

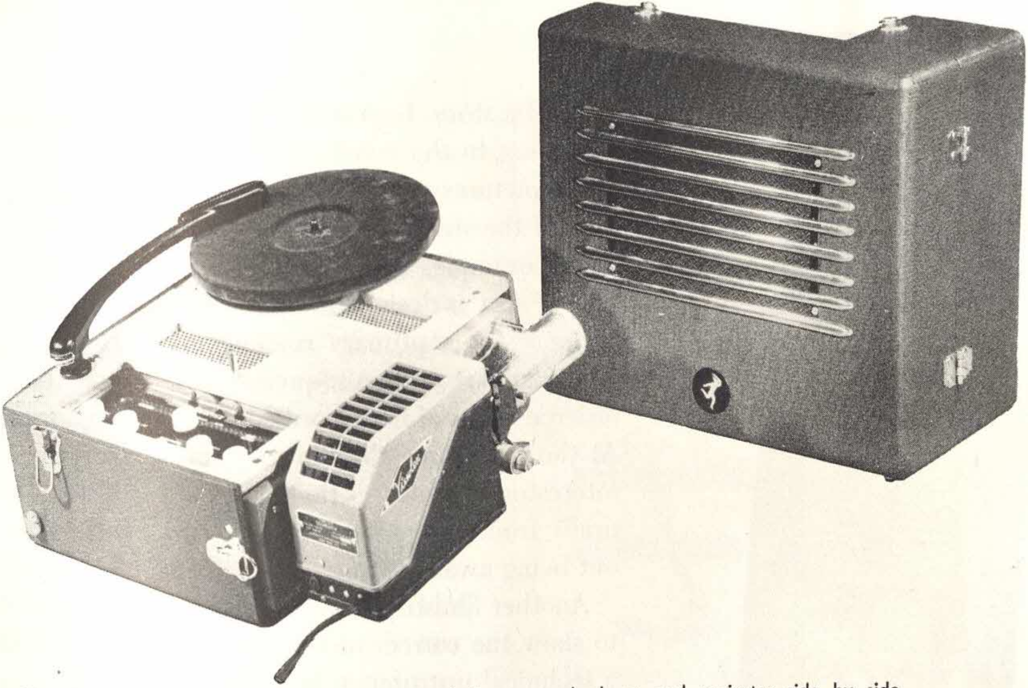

Fig. 13.5. A sound-filmstrip projector is essentially a record player and projector side by side. (Courtesy of Automatic Projection Corporation.)

tages of the filmstrip, namely, its adaptability for use at the speed desired. Thus the sound filmstrip becomes essentially a silent filmstrip. There are few explanatory captions, because most sound filmstrips contain no subtitles.

INSTRUCTIONAL CHARACTERISTICS

Of the several physical characteristics already discussed—the filmstrip (1) is easy and convenient to use, (2) takes up little space and is easily stored, (3) is inexpensive, (4) is available in either color or black and white, and (5) can be used at any desired pace because the pictures can be left on the screen as long as the instructor desires—the last point is of particular significance in certain types of instruction.

Three other characteristics have a bearing on the usefulness of the filmstrip in instruction. The pictures are in sequence, the room needs to be only slightly darkened, and filmstrips are available for a wide range of grade levels and subject areas.

Sequential Order

The sequential order and unity of the filmstrip are one of its principal instructional characteristics. It is designed to tell a story or a unified segment of a story. It proceeds step by step from the beginning to the conclusion (Fig. 13.6). The order of pictures and titles is determined by the purpose of the strip and the nature of the subject.

For example, *Peter and Susan Visit Grandfather's Farm*[3] is designed to provide background experience for a primary reading class. Hence the scenes are set up in a sequence which provides an ordered series of new word concepts about a farm. At the same time the filmstrip tells a story in an interesting manner so that the pupils are led naturally from one part of the farm to another without being aware of any pattern.

Another filmstrip, *The Micrometer*,[4] is designed to show the correct method of using and reading a technical instrument. It proceeds logically from the first to the final step in reading a micrometer. The last frames review the salient points.

In both these cases there is an ordered sequence of scenes and titles that is fixed according to the instructional purpose for which the filmstrip is designed. What are some of the distinct advantages and possible disadvantages of this fixed order of scenes in a filmstrip?

Room Darkening

One of the major advantages of the filmstrip is the fact that it can be used effectively in a semi-darkened room. During World War II, the army occasionally showed filmstrips outdoors by projecting them against the shaded side of a building. While this is unusual, it illustrates the possibility of good projection without extensive dark-

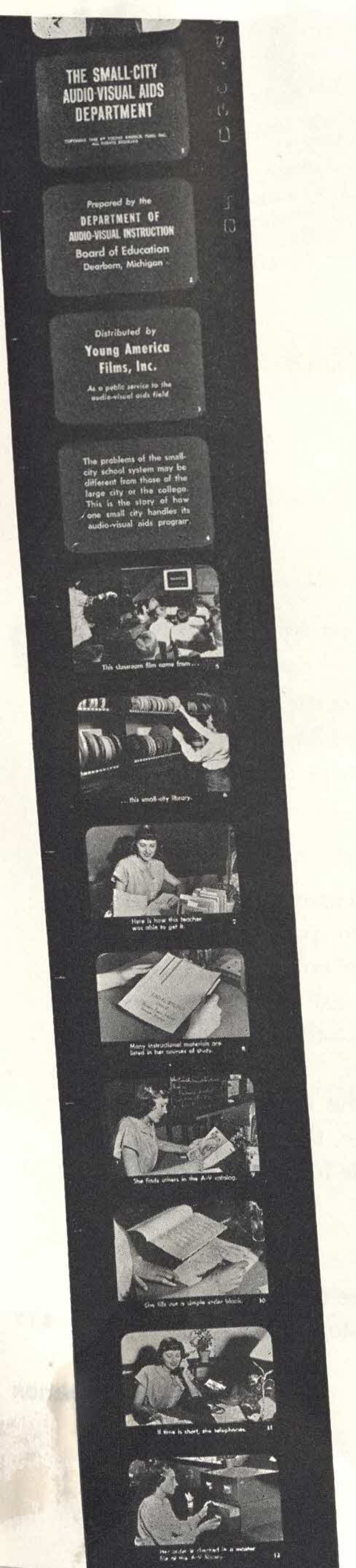
THE SMALL-CITY AUDIO-VISUAL AIDS DEPARTMENT
1
Prepared by the DEPARTMENT OF AUDIO-VISUAL INSTRUCTION Board of Education Dearborn, Michigan
2
Distributed by Young America Films, Inc.
As a public service to the audio-visual aids field
3
The problems of the small-city school system may be different from those of the large city or the college. This is the story of how one small city handles its audio-visual aids program.
4
This classroom film came from...
5
... this small-city library.
6
Here is how this teacher was able to get it.
7
Many instructional materials are listed in her courses of study.
8
She finds others in the A-V catalog.
9
She fills out a simple order blank.
10
If time is short, she telephones.
11
Her order is checked in a master file at the A-V library.
12

Fig. 13.6. The filmstrip story unfolds frame by frame from beginning to end. (Courtesy of Young America Films, Inc.)

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[3] Society for Visual Education.

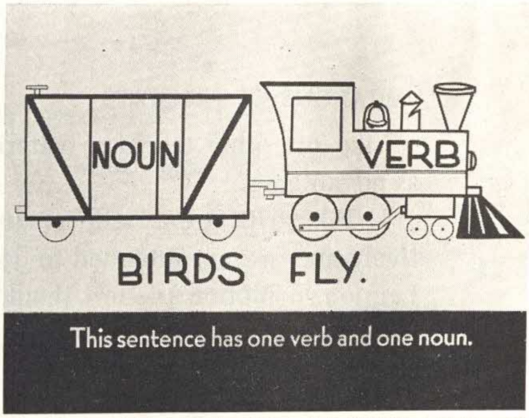
[4] United World, Castle Films Division.

ness. So long as the screen surface can be protected from strong, direct light, satisfactory black-and-white projection can be done without difficulty. The projection of colored filmstrips requires a darker room for equally effective results because the color emulsion is several times thicker than the black and white.

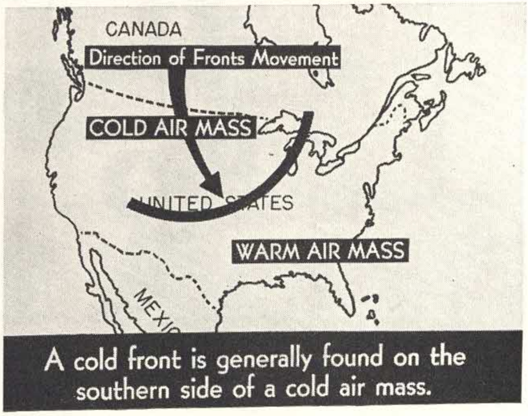
Wide Range

The increasingly wide range of filmstrips now available to the teacher is another point in their favor. The demand as well as the relatively low production costs has encouraged producers to turn out large numbers of filmstrips in virtually every subject for the various grade levels. An idea of their scope is given by Fig. 13.7. Sources are listed on pages 537–538.

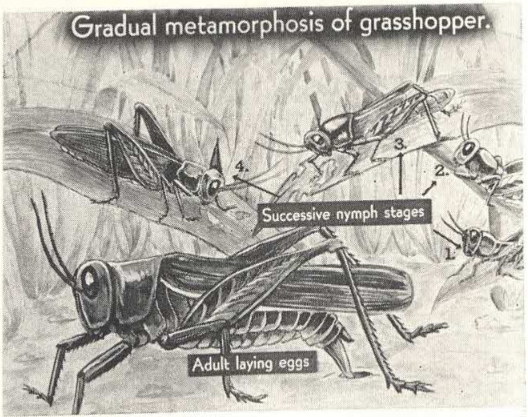
An interesting development in this connection is the extent to which publishers of textbooks are producing filmstrips closely correlated with text materials. The reverse is also occurring, as is evidenced by the production of 16 mm. teaching films correlated with textbooks. Both represent a healthy trend toward the more integrated use of several kinds of instructional materials on the basis of the particular value offered by each type.



This sentence has one verb and one noun.



A cold front is generally found on the southern side of a cold air mass.


Gradual metamorphosis of grasshopper.

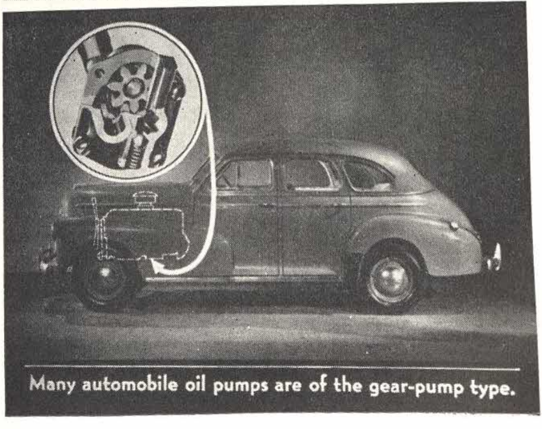

Many automobile oil pumps are of the gear-pump type.

Fig. 13.7. Filmstrips on a wide variety of subjects are available. (Top three pictures courtesy of Society for Visual Education, Inc.; bottom figure, courtesy of The Jam Handy Organization.)

LIMITATIONS OF FILMSTRIPS

Like any other teaching material, the filmstrip has limitations as well as advantages.

1. Filmstrips are a "still" medium. They cannot portray motion effectively and are not intended to do so. If motion is necessary for comprehension, a motion picture should be used. Once the motion aspect is understood, however, the filmstrip is excellent for detailed study and review. For this reason film and filmstrip make a good instructional "team."

2. The order of scenes on a filmstrip is rigid. It is not possible to change the order of scenes, and scattered scenes cannot conveniently be projected. Separate slides are preferable in the latter case, for slides can be shown in any order or number without distraction from irrelevant scenes that are flashed across the screen.

3. Filmstrips are rather easily damaged. The base of a filmstrip is cellulose acetate, a substance which is resistant to ordinary wear and tear and is also noninflammable. The sprocket holes will break easily, however, if the projector is not properly threaded or is out of adjustment. Unfortunately there is no practical way of repairing damaged sections. Since damage of this kind ordinarily occurs on the leader strip while the projector is being threaded, it can usually be detected before the picture section itself is damaged. Rubberized rollers instead of sprockets may well provide a solution to the problem of sprocket-hole damage. But until the use of these rollers becomes universal, reasonable care in using the projector will hold such damage to a minimum.

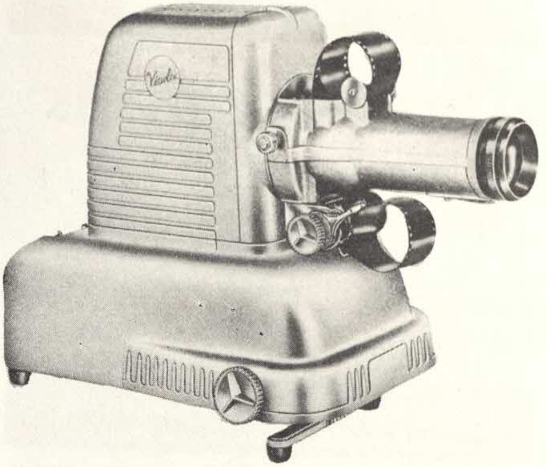


Fig. 13.8. Filmstrip projectors are easy to operate. (Courtesy of Viewlex, Inc.)

FILMSTRIP AND SLIDE PROJECTORS

A filmstrip projector (Figs. 13.8 and 13.9) is essentially a simple mechanism. It consists primarily of a lamp, a reflector, a series of lenses, and a smooth channel for the film. Near the base of this channel is a knob which is turned by hand to pull the filmstrip through the projector. The

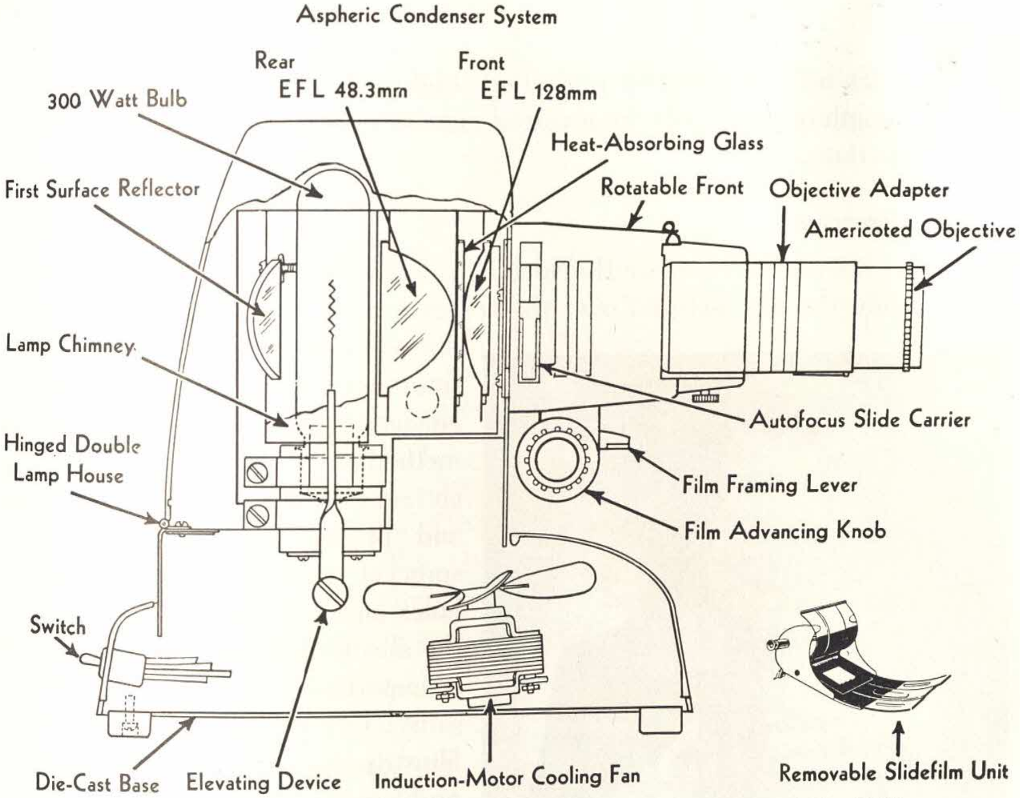


Fig. 13.9. Schematic diagram shows principal parts of a filmstrip projector. (This and Fig. 13.10 courtesy of American Optical Company.)

knob turns a sprocket wheel whose teeth fit into sprocket holes on the filmstrip. The projector is easy to operate, and it is both inexpensive and light in weight—all points of practical importance.

Filmstrip projectors usually project 2″ x 2″ slides as well as filmstrips. A slide carriage comes with the projector and is easily inserted (Fig. 13.10). Slides are placed in the carriage in the desired order; they are ordinarily changed by shifting the sliding section of the carriage from one side to the other. Since the picture on a 2″ x 2″ slide is identical in size with a double-frame picture on a filmstrip, the same lens and light system is effective for both.

SELECTION OF FILMSTRIP PROJECTORS

Different makes of filmstrip projectors vary somewhat as to threading, intensity of light, and methods of cooling. Each of these factors is worthy of consideration in selecting a projector. Another factor of some importance is the length of projection required. The method of threading applies only to filmstrip projection. Light intensity, cooling system, and length of projection are involved equally in both filmstrip and slide projection.

Threading

Some projectors are threaded by opening the gate and fitting the film into the channel and over the sprocket teeth. On other projectors the film is inserted into the film channel from above and pushed down until it engages the sprocket teeth. The latter method has the advantage of insuring correct alignment in the film channel and proper engagement with the sprocket teeth. Since the sprocket holes on filmstrips are easily broken, the means of threading the projector is important. The development of a satisfactory pressure-roller system for filmstrip projectors could solve the problem of both ease of threading and avoidance of film damage.

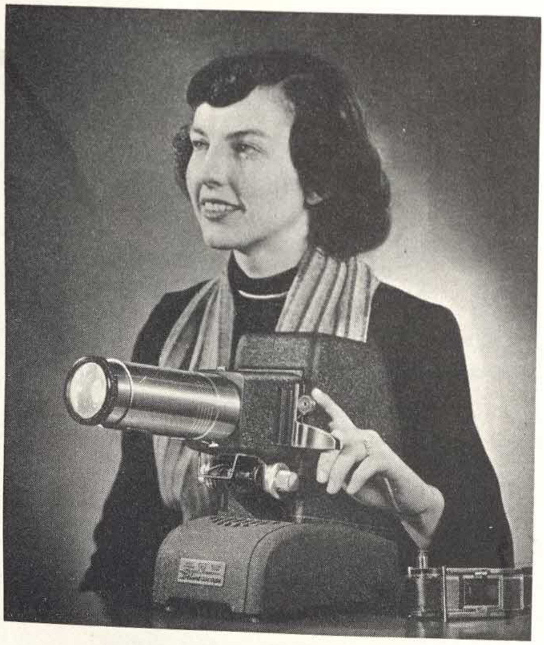


Fig. 13.10. Most filmstrip projectors also project 2" x 2" slides.

Brilliance of Image

The intensity of light determines the brilliance of the projected picture on the screen and the degree of darkness necessary for effective projection. Light intensity is determined primarily by the power of the projection lamp and the quality of the lens system. Although projectors with 150-watt lamps are available, one with a 300-watt lamp is usually more satisfactory for most classrooms. The lens system is of almost equal importance as the power of the projection lamp. Improvements in the lens systems have resulted in greatly increased lighting efficiency in some projectors.

Screen brightness over the entire picture area is the most important single factor in the effective projection of filmstrips.[5] The most satisfactory method of comparing brightness is to test the several projectors being considered. Projecting the same filmstrip (preferably a color filmstrip) simultaneously on two or three projectors will show quickly which one produces the best image.

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[5] Vera Falconer, *op. cit.*, p. 86.

Cooling Systems

Cooling systems on filmstrip projectors are of two general types—with and without a fan. The fanless type has a series of metal plates to carry off some of the intense heat generated by the lamp. The fan type forces a steady flow of air through the lamp house to carry off the heat. It is the more efficient as well as the more expensive of the two.

Since one of the significant instructional advantages of the filmstrip is the fact that pictures can be shown on the screen as long as desired, an efficient cooling system is essential. Prolonged exposure to excessive heat causes a filmstrip or slide to blister. Once damaged in this way it is no longer satisfactory for use. The alternative is to avoid leaving a frame on the screen for more than a minute or two, but this restricts the filmstrip's usefulness.

Projection Lenses

The focal length of the lens, the size of aperture, and the distance from projector to screen determine the size of picture seen. It is normally desirable to project from the rear of the classroom to avoid distracting pupils or blocking the view of those who are seated behind the projector. For these reasons, the length and size of the projection should be considered when purchasing a projector.

Most filmstrip projectors are equipped with a 5″ projection lens which produces an image 42″ x 55″ from a distance of 25 feet, and an image 48″ x 65″ from 30 feet.[6] While the 5″ lens is suitable for most classrooms, a 7″ lens is preferable for larger rooms such as assembly rooms and auditoriums. With this lens, a projector 50 feet from the screen will provide a picture 58″ x 77″.[7] At this distance the picture projected by a 5″ lens would be too large for the average portable screen. Hence if the same projector is to be used for both auditorium and classroom purposes, it may be desirable to have more than one lens.

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[6] Ellsworth Dent, *The Audio-Visual Handbook,* Society for Visual Education, Chicago, 6th ed., 1949, p. 219.

[7] The figures given are for the usual single-frame filmstrip. Double-frame filmstrips and 2″ x 2″ slides provide pictures which are 4.5′ x 6.5′ at 25 feet, 5.4′ x 7.8′ at 30 feet, and 9.0′ x 13.0′ at 50 feet.

Since the brilliance of the image is very important for good projection, it is well to note that the brilliance is reduced in proportion to the square of the distance between projector and screen.[8] The condensing lens system of a projector is usually adjusted for optimum brilliance by a standard projection lens. When a longer or shorter lens is used, a certain degree of brightness is sacrificed unless corresponding adjustments are made in the condenser lenses.

Such technicalities as those involved in lens systems need give little if any concern to the administrator or instructor interested in selecting a good projector. For practical purposes, demonstrations of the various makes of equipment in the rooms where it will be used will answer most questions regarding lens size and the effectiveness of the projected image.

USING FILMSTRIPS EFFECTIVELY

Several characteristic advantages of the filmstrip have been pointed out. In order that they may be realized, the instructor must know how to use filmstrips effectively.

SELECTION

The first step raises the question as to whether the filmstrip can serve the teaching purpose better than any other available device. This must be decided in terms of what the filmstrip can and cannot do, i.e., its inherent characteristics. These will be reviewed in the form of several questions which the instructor might well ask himself.

1. *Is the purpose for which I wish to use this filmstrip one in which motion is inherently necessary for pupil understanding?* If so, the filmstrip is not the best medium because it is a still picture medium. On the other hand, if the motion aspects of a subject such as the gasoline engine have already been presented by a film or a cutaway model, and the immediate purpose is to develop a more detailed understanding of the operating parts of the engine, the filmstrip may serve the purpose very well.

2. *Does my teaching purpose involve a series of step-by-step developments, one leading to the next in logical sequence?* If so, the filmstrip is well suited, since it is usually designed to tell its story in a series of related steps. But if sequence is not important, slides may prove more useful.

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[8] Vera Falconer, *op. cit.*, p. 87.

TAILOR SHOP
Our town is like a chain.
13

Fig. 13.11. Clear interesting pictures capture and hold the attention. (From *We Depend upon Each Other*, courtesy of General Mills, Inc.)

3. *Are suitable filmstrips available for the particular teaching job I have in mind?* This is a question of practical import to most teachers because keeping track of the large number of new filmstrips in any given field is a considerable task. Professional journals frequently contain sections that review new films and filmstrips. In addition, several publications provide periodic evaluations of such materials; these are listed in the footnote on page 537.

The importance of careful selection of filmstrips for effective results is suggested by two studies in the areas of geometry and the social studies. Each raises the question of the uniqueness and quality of the filmstrip used in the study.

Johnson[9] found that a combination of three motion-picture films and three filmstrips definitely improved retention and ability to apply geometrical principles and facts regarding circles. Neither films nor filmstrips alone produced comparable results. The initial learning of facts and problem-solving skills in geometry was not increased by the use of films and filmstrips, but Johnson suggests that this may have been due to the fact that the materials themselves were similar in nature to those commonly found in textbooks or drawn on the blackboard by the teacher. According to him: "Experimental results might be considerably more favorable to the effectiveness of visual materials if the audio-visual aids would bring to the classroom unique experiences that are vital and functional to the adolescent student, experiences different from those supplied by the textbook or teacher or by other non-visual aids."[10]

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[9] Donovan A. Johnson, "Are Films and Filmstrips Effective in Teaching Geometry?" *School Science and Mathematics*, October, 1950, pp. 570–574.

Vandermeer[11] similarly stresses the fact that the pictures on a filmstrip must contribute something unique if the filmstrip is to be any more effective than words in the learning situation. He compared results, in terms of immediate factual learning and recall of information over a three-week period, from using a particular American history filmstrip with one group and only the reading material from that filmstrip with another group. He found no significant superiority for either group. In assessing his findings Vandermeer came to the conclusion that ". . . when the pictorial element of the filmstrip is deficient in detail, definition, or clarity, it not only fails to contribute to the students' knowledge but may actually serve to inhibit learning."[12]

In a word, to secure effective results with filmstrips, the instructor must first select filmstrips which tell their story primarily through pictures rather than words. Second, the pictures must be of such nature and quality as to contribute something at once significant and unique to the learning situation. These two principles probably apply with equal validity to any type of still picture used in teaching.

PREVIEW

A second step in using filmstrips effectively is a careful preview of those selected, for the purpose of preparing the instructor. He must know rather precisely what the filmstrip contains in planning how to use it with his pupils, what points to emphasize, and what points require additional clarification.

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[10] *Ibid.*, p. 573.

[11] A. W. Vandermeer, "Relative Contributions to Factual Learning of the Pictorial and Verbal Elements of a Filmstrip," *School Review*, February, 1950, pp. 84–89.

[12] *Ibid.*, p. 88.

The preview likewise enables him to decide on how to use the filmstrip to the best advantage. Is it stimulating enough for the introduction? Does it fit well into the body of the lesson? Is it best suited to the summary and review? Or can it be used to advantage at several points and for more than one purpose?

CLASS PREPARATION

Having determined, after previewing the filmstrip, how he will use it in the lesson, the instructor must get the class ready to see it. There are several ways to accomplish this.

1. *He may explain why the pupils are shown this filmstrip at this particular time.* This may call for only a brief statement or it may require extended discussion. The point involves pupil readiness. It depends somewhat on the interest already present and on previously acquired information about the topic. It is not a separate, distinct step but rather part of the motivation process. The important thing is that the students *want* to see it for reasons of their own.

2. *He should indicate clearly what to look for.* How an instructor uses a filmstrip or any other kind of teaching material naturally depends on *why* he is using it—in other words, his specific objectives. Should his purpose be to provide a general overview and arouse interest, he may indicate general rather than specific points to be looked for. On the other hand, if he wants to clarify certain definite concepts, he will wish his students to be alert for the answers to specific questions. For example, in using *The Slide Rule—Multiplication and Division,*[13] the mathematics instructor might well ask in advance such questions as the following:

   a. What two scales on the slide rule are used for multiplication and division?
   b. How should the scales be lined up to multiply? To divide?
   c. How and where is the result found?

3. *He should anticipate new or difficult words, phrases, and symbols.* Unless the primary purpose of using a filmstrip is to teach new word concepts, as in a reading lesson, it is essential to remove in advance such bar-

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[13] U.S. Office of Education; available from Castle Films.

riers to learning as new words and symbols. This can be done through discussion, use of the dictionary, and illustrations. The new concepts will then be applied promptly as the filmstrip is shown, and they are likely to be well learned as a result. Of much greater importance, however, is the pupil's improved comprehension of content made possible by the removal of vocabulary barriers.

PRESENTATION

Mechanical as well as instructional considerations are involved in the effective use of filmstrips and slides.

Most teachers quickly sense the convenience, as well as the great effectiveness, of having all their teaching materials ready for use at the beginning of the period. The filmstrip or slide projector can be set up and tested in a few minutes, so that at the proper moment a flick of the switch will bring the first picture to the screen without delay and confusion.

More important is the fact that when everything is in readiness, lesson interruptions are held to a minimum. The filmstrip, slide, or other projected medium fits smoothly and naturally into the learning experience. It assumes its proper integrated role in helping to put across certain ideas without attracting undue attention to the operator and the projector. The instructor is not forced into the unhappy and too familiar position of saying, "And now, boys and girls, we are going to see some pictures of the Monarch butterfly"—and adding fervently to himself, "I hope."

The Captions

What should be done about the captions? Does the teacher read them aloud or does he leave them on the screen long enough for the slowest readers to comprehend them? The following discussion between a friendly supervisor and one of his teachers throws some light on this problem:

"Well, John, let's back up a bit. Why are you using this filmstrip at this point? As an introductory overview perhaps? If so, it is quite appropriate to read the titles as you go along. It saves time, keeps things moving, and, most important, it assures everyone's following the story as it unfolds on the screen.

"On the other hand, if you are using the filmstrip as a basis for discussion and the students have already seen it, there may be no point in reading the titles aloud. What you want here is discussion, explanation, and questions. There is no need for hurry. In fact, you may want to devote the rest of the period to just a few scenes. One advantage of the projected still picture, as you know, is that you can leave the pictures on the screen just as long as necessary to accomplish your purpose.

"Then there is also the possibility that you are using the filmstrip for a quick review, to 'clinch' ideas which have been developed. It might be a good idea to read the titles again. You are the best judge of that. But if so, why not let some of your students do the reading? You can tell something about how well they understand by how they read the captions. . . . And besides, unless you're quite different from most of us, you've probably talked too much in your class today anyway."

THE FOLLOW-UP

Evaluation

After the filmstrip has been used, the instructor may wish to evaluate the results. If so, a brief written or oral test can be given or, better still, he can call for a practical application. Suppose, for example, that the filmstrip dealt with how to read a micrometer. The real test not only of the filmstrip but of the total job of teaching is how well each pupil can read a micrometer.

Evaluation becomes more complicated when the purposes of the lesson go beyond skills and factual information to desirable habits, attitudes, and ideals. The follow-up discussion will provide the teacher with opportunities to observe reactions and new points of view, and to answer questions which suggest further activities. Such observations enable the sensitive instructor to assess subjectively whether progress is being made in the desired directions.

Application

Aside from evaluation, the follow-up serves the essential functions of applying newly acquired knowledge and interests and relating them to former experiences. The learner normally proceeds from observation to abstraction, generalization, and assimilation. Seeing a filmstrip is only a small part of this process. A variety of further activities should develop from the new interests. Some children will need to have further study, others will need little encouragement to explore on their own, and all should have an opportunity to make comparisons with similar experiences they have had.

Assimilation

Out of such comparisons, when there are enough of them, conclusions may come. Conclusions based on related experiences lead gradually to generalizations. After seeing Grandfather's farm in a filmstrip, Miss Miller's boys and girls know that there are cows, horses, chickens, and pigs on it. After seeing other filmstrips, films, and pictures and after visiting a farm they should begin to realize that these animals are typical of many farms. This is a generalization. Later experience will refine this generalization as the students learn that certain animals are found chiefly on midwestern dairy farms and that others are more typical of farms in various other specific regions of the United States.

Similarly the concept "horse" develops from one particular animal in one particular picture through a whole series of related learning experiences until Johnny realizes that horses may be of many sizes, shapes, and colors and still be horses. From then on, this generalization, simple though it is, provides the foundation on which all his further learning about horses will be built. Educationally we say that he has *assimilated* this knowledge.

TRANSPARENT SLIDES

CHARACTERISTICS OF SLIDES

Slides and filmstrips are essentially similar, with one major exception, namely, that slides can be shown individually in any desired order. Characteristics common to both include the following:

1. Slides and filmstrips are still picture media; they are of great value in visual teaching situations when motion is of little or no importance for comprehension.
2. They are inherently suited to the convenient presentation of a great variety of visual materials such as pictures, cartoons, charts, graphs, diagrams, maps, and tables. Virtually anything that can be photographed can be put on a slide (Fig. 13.12).

3. Both have the attention-focusing power of any projected image.
4. They are particularly well suited for color as well as black-and-white projection.
5. Both can be made in school, though slides are more easily prepared than filmstrips.
6. They are easy to project.
7. Both require only a slight darkening of the room.
8. They are inexpensive.
9. They cover a wide range of subjects and grade levels.

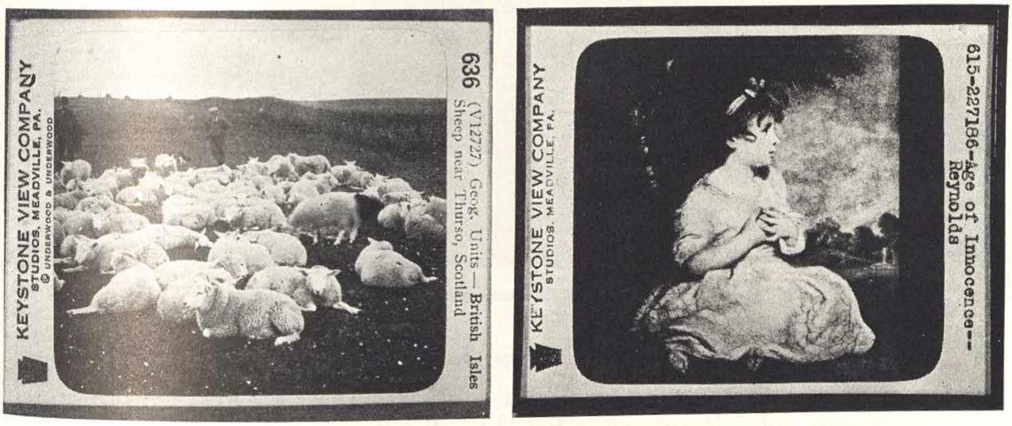

Fig. 13.12. Slides are available on a wide range of subjects. (Courtesy of Keystone View Company.)

Most of these characteristics have already been discussed in connection with filmstrips and flat pictures, and hence no further discussion is necessary because of the essential similarities of these media. So far as the image on the screen is concerned, there is very little difference between filmstrips and slides. However, there are certain distinctions between the two; furthermore, the slide has both advantages and limitations as a teaching tool.

Physical Characteristics

A slide is an individually mounted transparent picture or image which is projected by passing a strong light through it. Slides are commonly either 2″ x 2″ or 3¼″ x 4″ in overall size. The transparency on a 2″ x 2″ slide is identical in size to a double-frame filmstrip. The transparency on a 3¼″ x 4″ slide is usually 2¼″ x 3″ with a half-inch margin on all four sides.

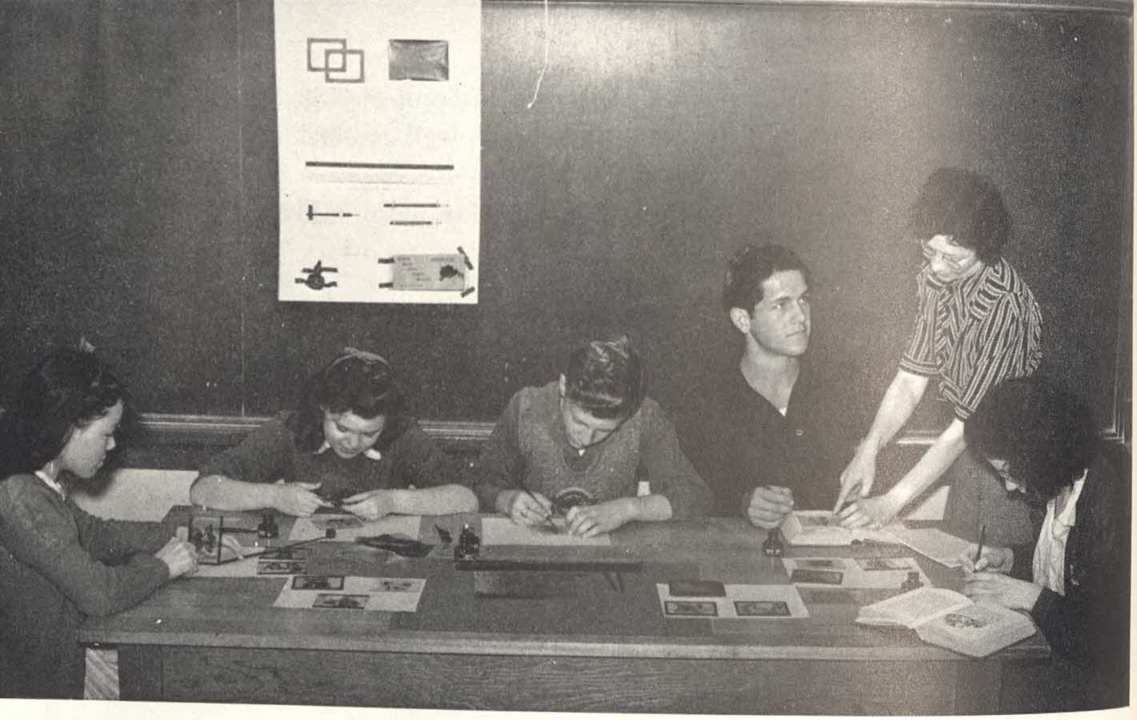

Fig. 13.13. Pupils can make their own slides. (Courtesy of Los Angeles City Schools.)

A 3¼″ x 4″ slide is usually mounted between pieces of glass; a 2″ x 2″ slide may be mounted on a piece of cardboard or between glass. A roll of 35 mm. color film that has been developed is normally processed in 2″ x 2″ slides in cardboard mountings called "Readymounts." This mounting takes up little storage space but provides limited protection against fingerprints or other damage to the surface. The 3¼″ x 4″ glass slide provides the same protection but is considerably heavier and bulkier.

Instructional Advantages

The standard 3¼″ x 4″ slide has long been a valuable teaching tool. It has two chief advantages over the smaller 2″ x 2″ slides. Since the surface of the slide is nearly 5½ times as large,[14] larger and more detailed images can be projected without loss of definition through diffusion. Reproductions of large maps, complicated charts and diagrams, tables, and other material in which printing and fine detail are important can be presented more effectively on the larger slides.

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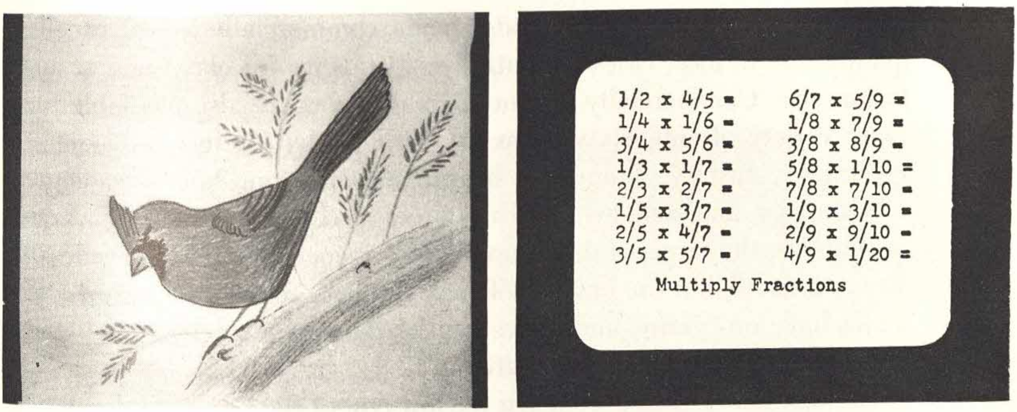
[14] The projected area of a 3¼″ x 4″ slide is 6.75 square inches; that of a 2″ x 2″ slide (double-frame) is 1.23 square inches.

A second advantage of this slide is the fact that it is large enough to permit slides to be handmade (see Fig. 13.13). Many exciting and valuable learning experiences are possible through making slides of various kinds, like those shown in Fig. 13.14. They can be made rather easily on etched glass, translucent plastic, cellophane, or clear glass, to name a few of the more common materials. Cellophane or translucent plastic slides can be lettered on a typewriter; thus effective lettering becomes quick and simple. Brooks summarizes the values and uses of handmade slides as follows:



1/2 x 4/5 =
1/4 x 1/6 =
3/4 x 5/6 =
1/3 x 1/7 =
2/3 x 2/7 =
1/5 x 3/7 =
2/5 x 4/7 =
3/5 x 5/7 =

6/7 x 5/9 =
1/8 x 7/9 =
3/8 x 8/9 =
5/8 x 1/10 =
7/8 x 7/10 =
1/9 x 3/10 =
2/9 x 9/10 =
4/9 x 1/20 =

Multiply Fractions

Fig. 13.14. A slide made with crayons, and a typewritten slide. Such slides are simple to make and are effective teaching tools. (Picture at left, courtesy of Keystone View Company.)

> Handmade lantern slides are useful as teaching aids, and in the hands of a skillful teacher they become effective tools. Pupils can use the slides for reports, for summaries, and for enriching projects through pictorial means. They can be used for presenting or previewing new material, supplementing and enriching material already in use, motivating interest, serving as a background for discussion, testing, reviewing, and summarizing. Materials which are not available or easily accessible for projection from other sources can be transferred to the slide.[15]

Convenience of use, quality, low cost, and ease of procuring are among the principal reasons for the great popularity of 2″ x 2″ slides.

The convenience of handling and storing small, light-weight slides is apparent. A filing case 10 inches long by 5½ inches wide will accommodate

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[15] Mary Esther Brooks, "Lantern Slides and How to Make Them," *See and Hear*, April, 1946, pp. 65–66.

100 of the 2″ x 2″ glass slides or 200 cardboard Readymounts, whereas a case of the same length and width but higher is necessary for 50 slides 3¼″ x 4″; the larger slides are considerably heavier and more fragile. Furthermore, the smaller slides can be projected in the same machine that is used for filmstrips; this projector is compact, light, and easy to set up and use.

The 2″ x 2″ photographic slides made commercially are of excellent quality and in most cases are entirely satisfactory for classroom or auditorium use. Commercially produced small slides are also available for a great variety of subjects such as art, bird study, foreign and domestic geography, history, literature, health conservation, home economics, meteorology, and zoology. Typical sources are listed on page 537. As was said above, the larger slide is superior for scenes involving considerable size and detail, but the number of such scenes is relatively limited. Color slides have no "grain" and hence can be blown up to considerable size without loss of satisfactory definition.

Another factor of importance is the low cost of the 2″ x 2″ slides. Black-and-white transparencies are proportionately about half as expensive as color.

One of the most pronounced advantages of the 2″ x 2″ slide is the fact that the instructor can have pictures he has taken, particularly in color, made into slides. The cost of the color film frequently includes the charge for developing and printing transparencies. With a little practice the teacher can get good results with a 35 mm. camera. He can take pictures of such class activities as field trips, laboratory experiments, exhibits, and various other group projects. He can likewise supply his own illustrations of local scenes for a social studies class; of plants, trees, and flowers for nature study; of livestock and fields at various stages of growth for an agriculture class.

PROJECTION EQUIPMENT

Good results with any projected visual material require good projection equipment. To be effective, a slide must be seen easily by every member of the class. This requires a projector with an efficient lens system and a lamp sufficiently powerful for the conditions under which it is to be used. Normally an instructor prefers a moderately darkened room for projection rather than a blackout. The trend in most types of slide projectors is toward equipment that is compact, relatively light, and powerful enough to function efficiently in classrooms that can be darkened only partially. With proper equipment, slides can be projected satisfactorily in classrooms that have ordinary window shades.

Lantern Slide Projectors

Projectors for 3¼″ x 4″ slides are of two principal types—the familiar horizontal type (Fig. 13.15) and the overhead type (Fig. 13.16). Each contains a cooling fan and will take lamps of 500, 750, or 1000 watts.

The horizontal projector is operated from the rear of the room. The overhead projector can be operated by the instructor from the front of the room as he faces the class, and he can point out on the slide itself any items to which he wishes to direct attention.

Projectors for 2″ x 2″ Slides

As was said above, most filmstrip projectors can be conveniently adapted for projecting 2″ x 2″ slides (see page 321). But special projectors for use with this size of slides are also available (see Fig. 13.17). They are usually equipped with 1000-watt lamps and a good cooling system. Quietness of operation is essential for the cooling system, for noise can be very distracting. A 5″ lens is usually standard equipment; a 7″ lens is recommended for use in auditoriums or before large groups.

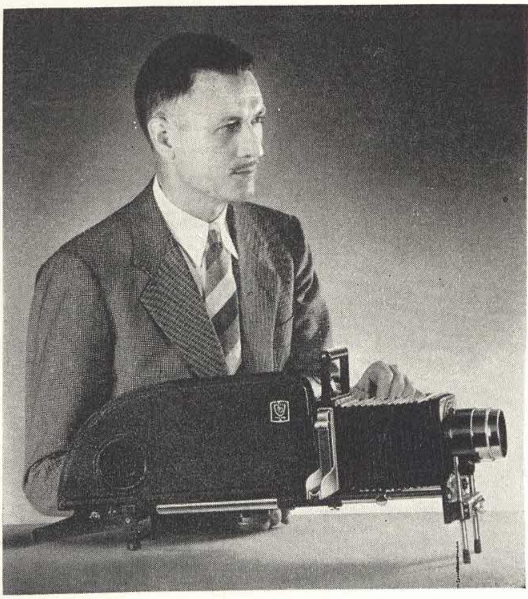

Fig. 13.15. A standard type of 3¼″ x 4″ slide projector for classroom use. (Courtesy of American Optical Company.)

USING SLIDES EFFECTIVELY

The principles discussed in connection with using filmstrips effectively —selection, preview, preparation of the class, presentation, and follow-up —apply equally to slides. In fact, with minor variations, they apply to the effective utilization of *any* kind of audio-visual material.

In showing a series of slides on Alaska, for example, the instructor would proceed just as he would with a filmstrip on Alaska except that the slides would probably have no captions. He might use the slides to introduce a unit on Alaska, as a basis for discussion, or for review. He might also use one or two particularly pertinent slides to illustrate a specific point during a discussion on the Matanuska Valley Project.

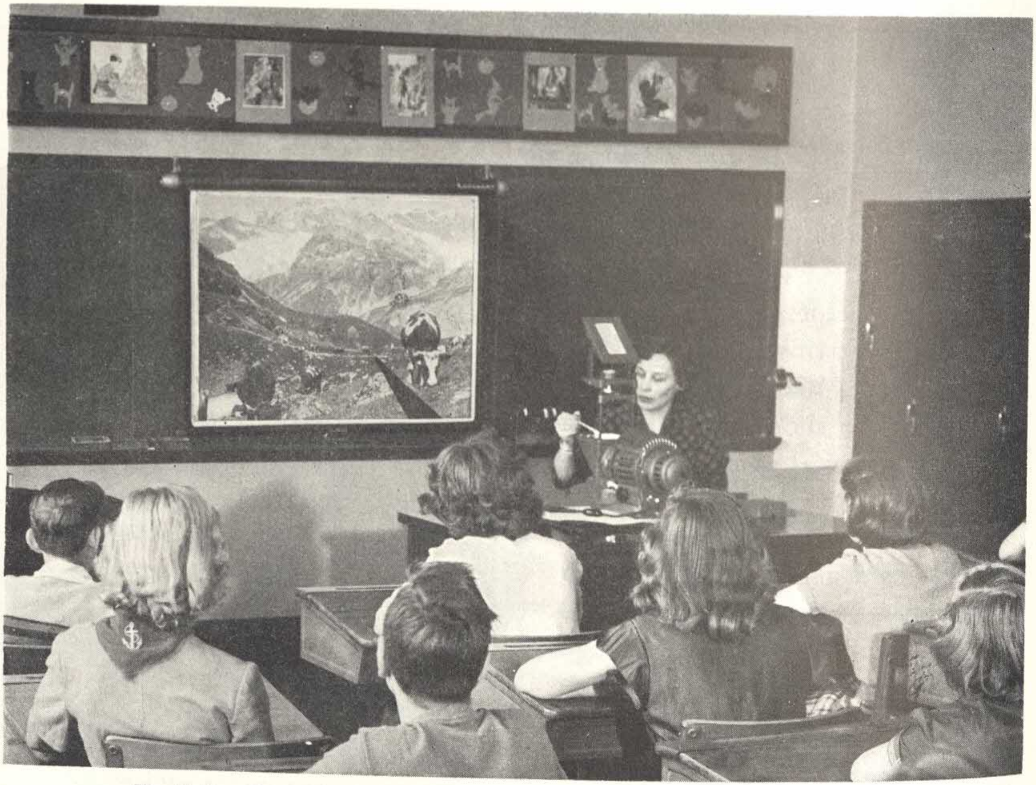

Fig. 13.16. The teacher can point out specific items with an overhead slide projector. (Courtesy of Keystone View Company.)

The experienced teacher realizes at once that the procedure he adopts depends on his purpose in using slides. Thus, in using only one or two, it is unnecessary for him to follow the fixed routine of preparation, testing, and follow-up. To do so would probably hinder the learners more than it would help them, since the elements of keen interest and pointed observation are already present. The stage has been set; why set it again? Furthermore, the pupils' reaction to the slide may in itself be adequate evidence that they have grasped the point. In this case the instructor knows that his purpose has been achieved, and the lesson can continue.

The principal elements of good utilization have been applied in the above example. The slides have been smoothly integrated into the lesson; although less noticeable, they are probably the more effective for that very reason. The important point is that the instructor, without breaking stride, has provided the necessary motivation, specific points to be looked for, testing, and incorporation of new information into the lesson.

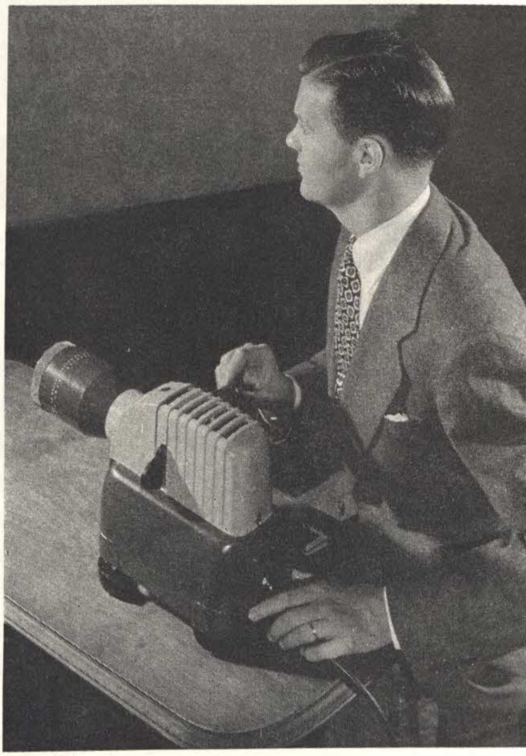
Fig. 13.17. A special projector for 2" x 2" slides has a 1000-watt projection lamp.

OTHER TYPES OF STILL PROJECTORS

While filmstrip and slide projection is valuable, other types of projectors should not be overlooked, because each has unique instructional advantages. Among these valuable teaching tools are the opaque projector, the overhead transparency projector, the microprojector, and the stereoprojector, to name only a few.

THE OPAQUE PROJECTOR

Potentially, one of the most useful types of still projection for instructional purposes is opaque projection. It permits nontransparent materials such as flat pictures, book illustrations, tables, drawings, photographs, pupils' work, and even certain specimens and objects to be shown on a screen for group observation.

The instructor with access to an opaque projector has available an almost unlimited amount of illustrative material at little or no cost. Furthermore, this material can be used almost as it is, for a minimum of mounting or other preparation is required. A theme, a mathematics paper, a sheet of typing, a page or diagram in a book, a picture in a magazine, a culture dish, a watch, coins, stamps or leaves—these are just a few of the objects that can be projected by an opaque projector (Fig. 13.18).

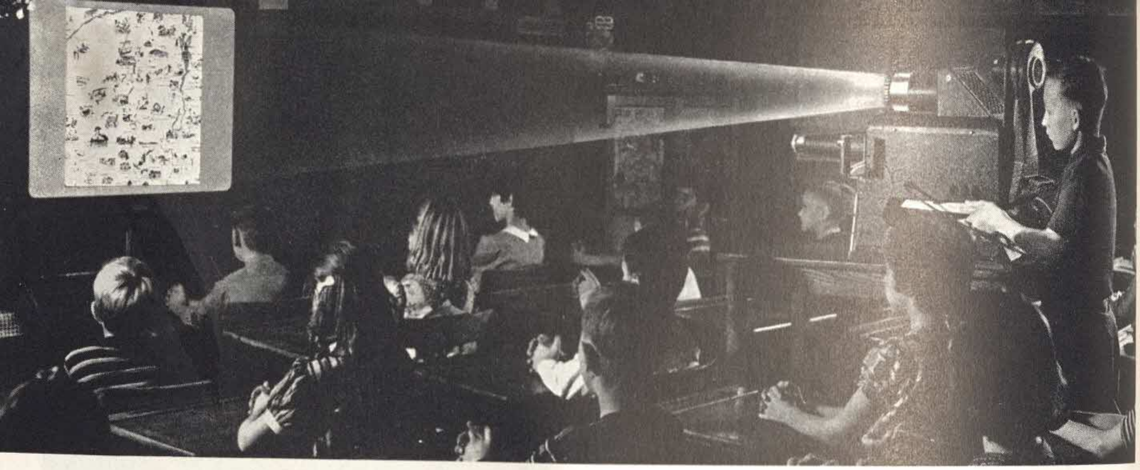

Fig. 13.18. Opaque projection is an effective and versatile medium that has a variety of classroom applications. (Courtesy of American Optical Company.)

Physical Characteristics

Opaque materials are projected by means of reflected light. The principle is that used in the old magic lantern. A strong light from the projector lamp is thrown on a picture, and this picture is reflected by a tilted mirror through a lens and onto a screen (Figs. 13.19 and 13.20). The screen image is likely to be less brilliant than in the case of a slide or other transparency where the light passes directly through the picture. Highly satisfactory images can none the less be obtained if the room is sufficiently dark. The lighting efficiency of the newer opaque projectors has been improved to the point where effective projection is possible in lighter rooms.

These improved opaque projectors have a 1000-watt lamp, an opening large enough to accommodate 8½″ x 11″ sheets, and an efficient motor-driven cooling system. Some models contain down-draft ventilation which not only protects the material from heat but also holds loose or unmounted material in place on the platen. A loose postage stamp, for example, can be projected without difficulty with this type of projector (Fig. 13.19).

The earlier projectors are also efficient. They have a 500-watt lamp, accommodate material up to 6″ x 6″ in size, and are usually cooled by a power-driven fan. For convenience in handling and for good projection it is well to mount loose illustrations on pieces of cardboard which are long enough to extend outside of the projector. Another handy device, mentioned in an earlier chapter, is the continuous strip for mounting material (see Fig. 4.16). The strip can be pulled through the projector without each piece having to be separately centered.

Some opaque projectors are dual-purpose machines that can project slides as well as opaque materials (see Fig. 13.18). Some rather ingenious combinations of both types of material are possible with this projector. For example, slides may be shown of two bar magnets in various positions—north to north, south to north, etc.—and real magnets may be placed in corresponding positions on the platen of the projector under a sheet of paper containing iron filings. A simple shift of a lever enables the class to see first the slide and then the lines of force set up by the real magnets in that position.

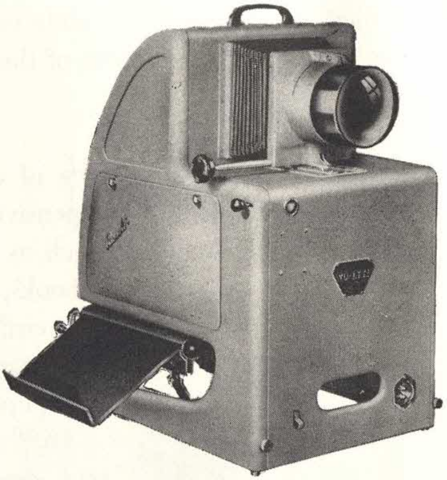

Fig. 13.19. An opaque projector which takes theme-size material and projects a bright image. (Courtesy of Charles Beseler Company.)

The Projection Cell

The use of a projection cell (Fig. 13.21) in the slide section of the projector permits the instructor to demonstrate such processes as a storage battery in operation, electrolysis, and chemical sedimentation. If narrow strips of copper and zinc are placed in a dilute sulfuric acid solution in this cell, the resulting reaction can be clearly projected on the screen. If the copper and zinc plates are connected to a galvanometer in the opaque section of the projector, the reading of the current generated in the cell can also be projected.

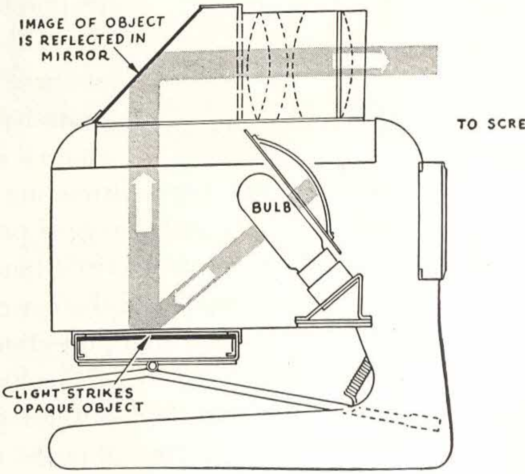
IMAGE OF OBJECT IS REFLECTED IN MIRROR
TO SCRE
BULB
LIGHT STRIKES OPAQUE OBJECT

Fig. 13.20. Principle of an opaque projector. The light follows the white arrows. (Courtesy of American Optical Company.)

The imaginative science teacher will see numerous possibilities for using a projection cell. It can be inserted in any horizontal 3¼″ x 4″ slide projector in place of the slide carriage. What advantages can you see in projecting demonstrations of the types mentioned above?

Advantages and Limitations

The principal advantage of opaque projection is the great mass of readily available and inexpensive materials which can be thus projected. Much of this material, such as pupils' written work, illustrations from magazines and reference books, useful diagrams, and tables, would not ordinarily be made into slides. There is a further advantage in that the instructor can keep this material up-to-date.

Another unique value of the opaque projector is its convenience for enlarging and transferring illustrative material to a chalkboard or chart. A small news map, for example, can be projected on a chalkboard in any desired size and quickly traced for a current events discussion.

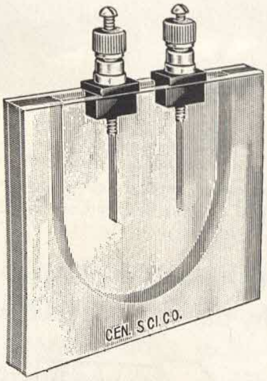

Fig. 13.21. A projection cell permits the projection of chemical reactions. (Courtesy of Central Scientific Company.)

Furthermore, opaque projection shares the attention-focusing power that any projected image has. Even when other methods of presentation are possible, such as charts or bulletin boards, the projected image is likely to be more effective because it makes possible enlargement, greater concentration, and fewer distracting elements. In addition, opaque projection permits variety and change of pace in instructional procedures.

Most of the characteristic limitations of this process have been minimized or eliminated in the newer types of equipment. Foremost among them was the fact that projection was not effective unless the room was well darkened. Another difficulty was that only small materials could be used in the projector. A third problem, though a minor one, was the necessity of mounting all pieces of paper to avoid flutter and consequent loss of focus while they were being projected. Other disadvantages were the danger of scorching or warping because of the intense heat, and the relative bulk and clumsiness of the projector itself.

Recognizing that its many advantages far outweigh its limitations, teachers have made regular and effective use of opaque projection for many years. With the improved equipment now available, it is probable that the opaque projection will assume its rightful position in day-to-day instruction.

THE OVERHEAD TRANSPARENCY PROJECTOR

One of the more unique projection developments to come out of World War II is the overhead transparency projector (Fig. 13.22). Similar in principle to the overhead slide projector (see Fig. 13.16), it has a variety of highly practical applications in the classroom. A smaller model is shown in Fig. 13.23.

The overhead transparency projector was known in the armed services by the rather indefinite title, "visual aids projector." It is now known principally by the trade names Vu-Graph[16] and Visual-Cast[17] which have the virtue of being specific if not particularly descriptive.

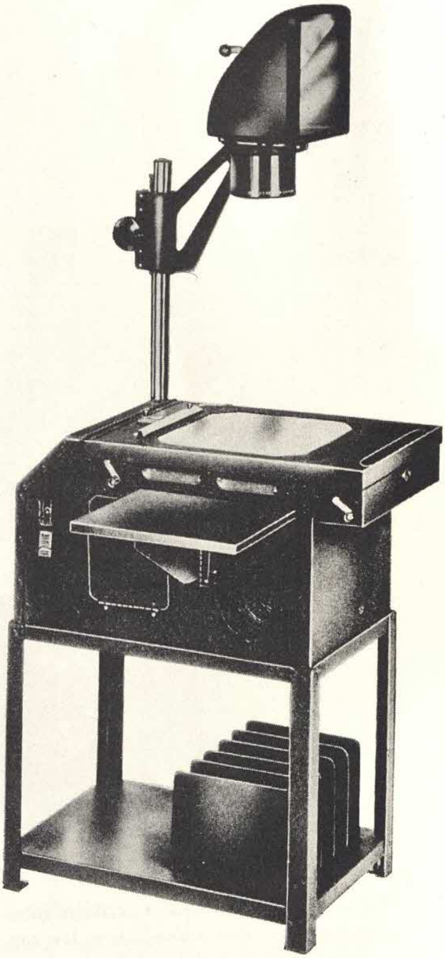

Fig. 13.22. Overhead transparency projection has many useful classroom applications. An enclosed 100 foot roll of cellophane on which the teacher can write with a grease pencil is a unique feature of this projector. (Courtesy of Charles Beseler Company.)

Physical Characteristics

The overhead transparency projector reflects images on a screen in much the same manner as does the opaque projector, i.e., by means of a tilted, highly polished mirror and lens assembly. The image, however, comes from a powerful light that shines through a transparency. The screen image is brilliant enough to be seen in a lighted room even though only a 500-watt lamp is used.

The projection area ranges from 3″ x 3″ to 10″ x 10″ in the several models available. The transparencies are plastic, carbon, or cellophane

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[16] Vu-Graph Overhead Daylight Projector, Charles Beseler Company, Newark, N.J.

[17] Visual Cast Projector, Victorlite Industries, Los Angeles, Calif.

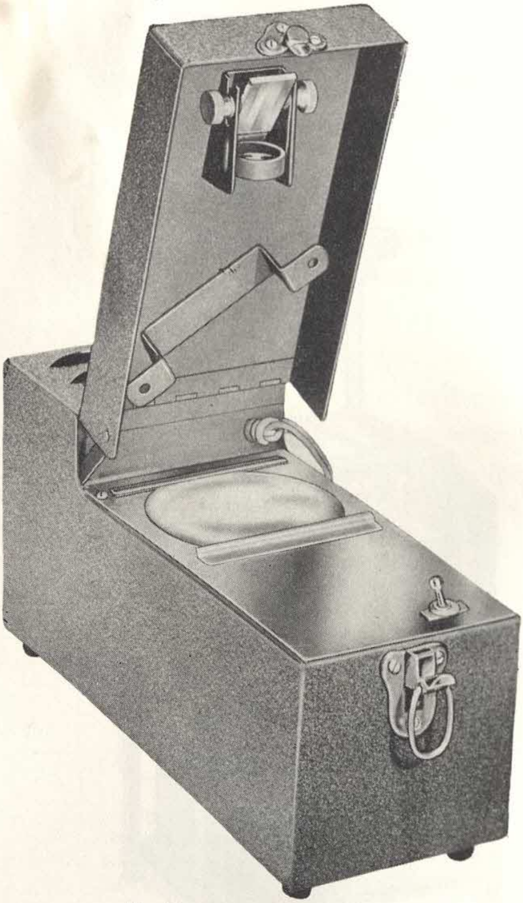

Fig. 13.23. A small type of overhead transparency projector that is available at low cost. (Courtesy of Visual Training Aids.)

sheets. Tracing, drawing, writing, and photographic reproductions made on these sheets can be clearly projected on the screen.

Advantages and Limitations

Aside from convenience and simplicity of operation, the overhead transparency projector has several other advantages. The projector is operated from the front of the room, which permits the instructor to face the class as he writes or indicates points of importance on the transparency. Writing on the plastic surface is done with a china marking pencil and is wiped off easily with cleansing tissue. Colored lines may be made with special crayons or plastic inks. A carbon-coated plastic gives white lines or letters on a black background. Typewritten copy can also be used effectively.

Probably the feature which appeals to most teachers is the cellophane roll attachment (see Fig. 13.22). A 100-foot roll of cellophane provides space for over 100 panels, any number of which can be prepared ahead of time and rolled into position by turning a small crank. Diagrams, lesson assignments, tests, and similar material can be effectively presented in this manner with a minimum of time and effort.

An elementary teacher observing a demonstration of an overhead transparency projector pointed out another advantage in the comment: "My blackboards are always so filled up and such a mess before the day is over! With a projector like this I could avoid a lot of that messy appearance and my pupils could see better besides."

A fourth feature of this projector is the possibilities it provides for overlays or "build-ups." Successive layers of transparencies in black and

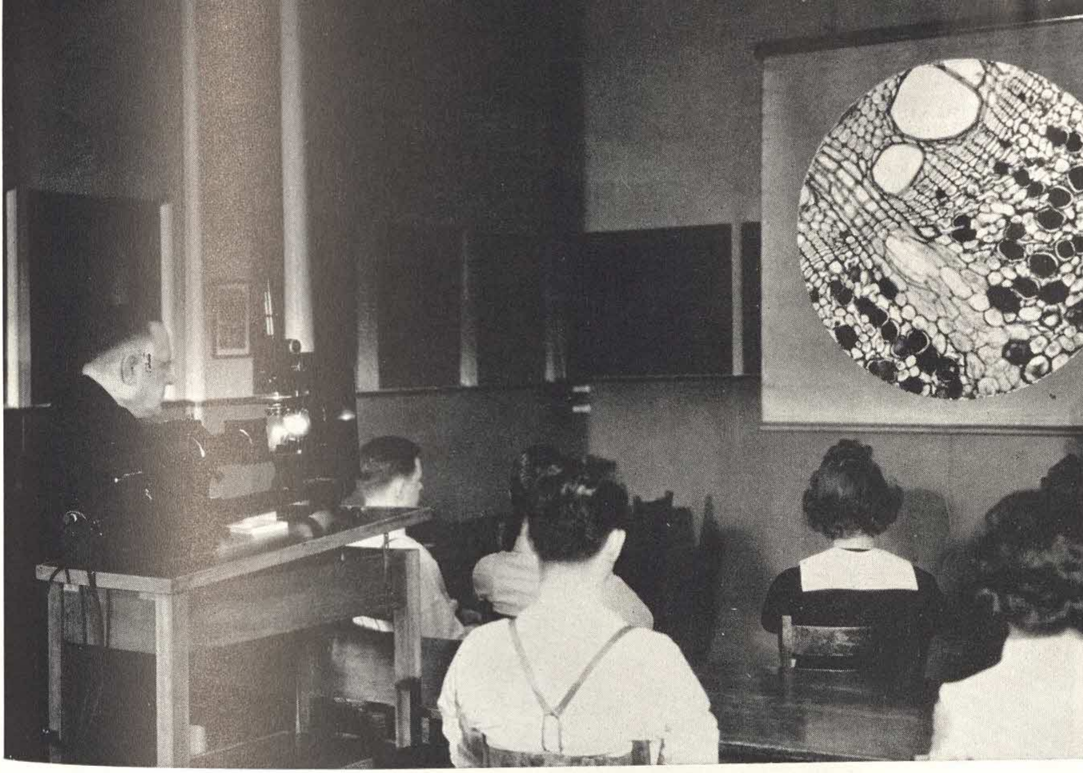

Fig. 13.24. The entire class can see with a microprojector what only one pupil at a time can see in a microscope. (This and Fig. 13.25 courtesy of Bausch & Lomb Optical Co.)

white, color, or both can show cumulative stages of development, sequences, and sectional views. Lettering, mechanical drawings, the several stages in completing a map or assembling a carburetor, and cumulative additions to a government chart are typical of the many possible uses of transparent overlays.

While relatively small and light, the overhead transparency projector is somewhat inconvenient to move from floor to floor or from one building to another. It can be rolled easily from room to room if it is on a floor stand but it can be carried more conveniently when disassembled. A carrying case is desirable for one that is to be used frequently in different buildings.

THE MICROPROJECTOR

One of the more specialized types of projection equipment is the microprojector (Fig. 13.24). As its name indicates, this projector is designed to project microscope slides so that an entire class may see what would be visible to only one pupil at a time if seen under a microscope. Furthermore, both wet and dry slides may be projected (Fig. 13.25).

Among the particular advantages cited for the microprojector are that (1) it minimizes the need for expensive microscopes for each student, (2) it presents a greatly enlarged picture of the object on the slide, and (3) it assures the instructor that his students are seeing precisely what he wants them to see.

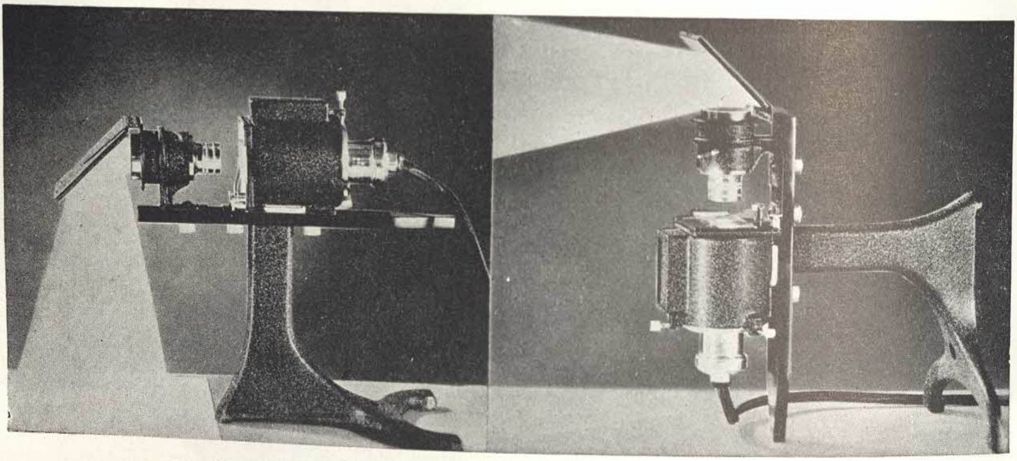

Fig. 13.25. Wet or dry microscope slides may be projected or enlarged with this projector.

Numerous phenomena suited for presentation on microscope slides can be shown with marked effectiveness on a microprojector. Sargent[18] lists such uses as the following:

1. Illustration of stresses and strains on fibers, filaments, and surfaces.
2. Physical examination of wood, cotton, silk, rayon, linen, and other textile fibers.
3. Gross projection of prepared slides showing fingerprints or other semitransparent print materials such as blood smears.
4. Visualization of interference patterns of light, and optical principles of refracted light.
5. Gross examination of properties of crystals and other common compounds such as minerals, foods, rubber, and petroleum by means of white and polarized light.

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[18] Theodore Sargent, "Using the Microprojector in Physics and Chemistry," in Harry C. McKown and Alvin B. Roberts, *Audio-Visual Aids to Instruction*, McGraw-Hill, New York, rev. ed., 1949, pp. 512–513.

6. Projection of crystal growth in solutions such as ammonium chloride, sodium nitrate, copper sulfate, potassium dichromate, and potassium chlorate. Removal of the projector cooling cell causes melting. Replacement of the cell results in crystallization which can be shown without changing the field of projection.

The biology instructor has even more varied opportunities for using the microprojector in presenting examples of cell structure, one-celled animals and plants in solution, cell division, plant and animal tissues, bacteria, mold spores, and the like. Some of these phenomena may be shown to elementary science classes provided the biology instructor can be persuaded to lend the projector and slides.

Virtually all prepared microscope slides now available can be projected with the microprojector.[19] Sufficient cooling of the light beam is necessary, however, to prevent damage to the material on the slide.

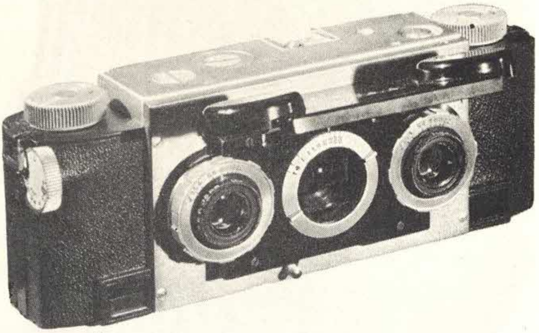

Fig. 13.26. The stereographic camera takes two pictures simultaneously from different angles. (This and Fig. 13.27 courtesy of David White Sales Company.)

THE STEREOPROJECTOR

Increasing attention is being given the possibility of projecting stereographic views for class use. Transparencies for this purpose are prepared in pairs from photographs taken with a stereographic camera (Fig. 13.26). This camera takes two pictures simultaneously with lenses a few inches apart. Each picture, therefore, is taken from a slightly different angle; and when both pictures are seen together in a stereoscope a highly realistic and vivid three-dimensional effect is obtained.

The familiar stereoscope permits only one person at a time to see a pair of pictures. The left eye sees one picture and the right eye the other; the brain combines them into one three-dimensional image.

When a pair of stereographic transparencies is thrown on a screen with a projector (Fig. 13.27), both pictures are seen by both eyes and the result is a confused agglomeration of vaguely defined images. A pair of specially designed glasses worn by each observer gives a striking three-dimensional image which stands out sharply and vividly. A field of flowers may look so real that a person has to resist the temptation to pick one.

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[19] *Ibid.*, p. 513.

Certain technical problems remain to be solved before stereographic projection can be entirely satisfactory. There is a tendency, for example, toward overexaggeration of depth in close-up views, and a similar aberration around the edges of a picture. The stem of a tulip near the edge may seem to be considerably longer than stems near the center of the picture, though actually all are approximately alike.

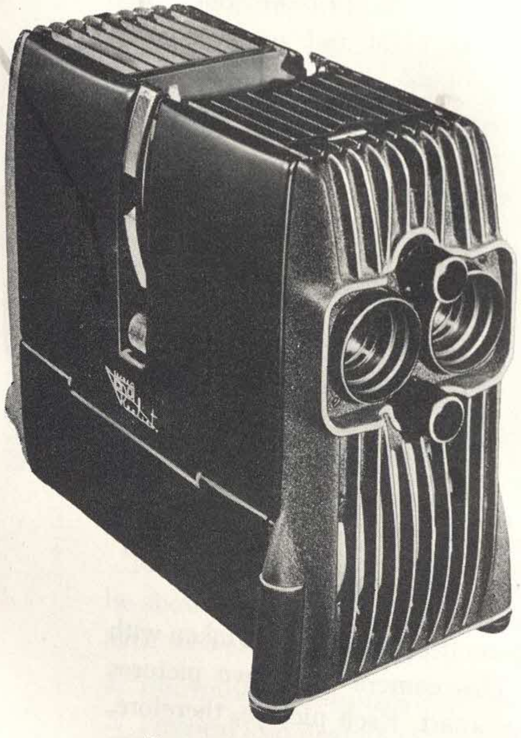
Fig. 13.27. The stereoscope projector.

The special screen and glasses required are additional drawbacks to stereographic projection for most instructional purposes. However, for certain specialized purposes such as surgical, art, and engineering training, the values of three-dimensional projection are important enough to merit its use.

SUMMARY

Still projection makes possible group examination of individual pictures and illustrative materials for as long as required for the teaching purpose. It also has the attention-focusing power of any projected image. Together these benefits constitute a powerful and effective teaching medium when motion is not essential to comprehension.

There are various forms of still projection such as filmstrips, 2″ x 2″ and 3¼″ x 4″ slides, opaque projection, overhead transparency projection, microprojection, and stereoprojection. Each has unique advantages and uses in instruction.

As with other audio-visual materials, the effectiveness of still projection media depends to a large extent on how they are used. In general, the familiar principles of all good teaching apply: preview and selection of the most appropriate materials; class preparation including motivation and direction on what to look for; good projection conditions; and follow-up, including testing, application, and reteaching as needed. Good procedure is flexible rather than rigid; it adapts itself to the requirements of the individual learning situation. The teacher's good judgment should determine when and how the principles of effective use can best be applied in a particular learning situation to achieve a balanced and well-integrated result.

Suggested Activities

1. As a committee or individual project, have units of work in a given subject and grade area analyzed as to (a) where still projection materials could make significant contributions to learning, and (b) what specific materials could do the job.
2. Survey the still projection equipment and facilities of your school and prepare a report for your principal or superintendent that includes:
   a. Present status.
   b. Recommended additions and changes for next year.
   c. Recommended changes and additions for the next five years. Draw up supporting statements for your recommendations.
3. As a building director of audio-visual instruction you have been concerned for several years over the tendency of most of your teachers to use motion-picture films rather than available still projection materials, regardless of the latter's superiority in many teaching situations. You get permission from your principal to call a faculty meeting for the purpose of "educating" your teachers regarding the potentialities of one or two types of still projection. Prepare a demonstration for your audio-visual class showing how you might do this.
4. Divide the class into committees and have each one prepare a demonstration showing interesting applications of one of the following: (a) the opaque projector, (b) handmade slides, (c) the projection cell, (d) the filmstrip projector, (e) 2″ x 2″ slides, (f) 3¼″ x 4″ slides, (g) the microprojector, and (h) the overhead transparency projector.
5. In order to give class members information about various makes of still projection equipment, have an interested group write for literature in sufficient quantities so that each member can have individual copies. If feasible, arrange with your local dealer for demonstrations of several makes of equipment.

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14. The 16 mm. Sound Motion-Picture Film

When the late Glenn Frank had completed seeing the film *Plant Growth* (Sound, B&W, 11 min., EBF), his reactions were as follows:

> Yesterday within the space of ten minutes, I saw a plant grow to full maturity, bear fruit, and die. As a child I often stood with awe before the mystery of plant growth and wondered what it might be like to see the actual processes of growth as I saw my playmates run back and forth across the village lawn.
>
> I had to wait forty years to see it, but yesterday, the thing I wondered about as a child, happened. I saw the processes of growth as clearly and as plainly as this morning I see motors streaming by in the street below my hotel window.
>
> Conan Doyle had not come back to show me marvels in a séance. I was not under the delusive spell of a magician. I was simply watching an educational film on plant growth.
>
> A pea was dropped on the ground. Soon its side burst open and a white sprout, or whatever the experts call it, came peering with manifest curiosity out into the open. The white sprout turned downward and began nosing about for a way to burrow downward in the soil. It nosed about with an appearance of almost animal sense. Soon it began its downward journey into the soil which had been cut away so the camera could catch the downward journey of the root.[1]

Of the many manifestations of twentieth-century genius the 16 mm. sound motion-picture film represents one of the greatest achievements.

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[1] From an original reaction sheet submitted by Glenn Frank, president of the University of Wisconsin, 1925–1937, to the University of Wisconsin Bureau of Visual Instruction.

The camera can record and document what it "sees." The sound recorder can record and document what it "hears." Through the 16 mm. sound motion picture, two of man's primary sensations, seeing and hearing, can be coördinated into a simultaneous record. This record, the sound motion-picture film, is an almost living document of things and events which take place in the world.

PHYSICAL DESCRIPTION

Any description of a sound motion picture must be approached by describing (1) the photographics and (2) the sound electronics of a device that in reality is many inventions.

A motion picture is a series of still pictures taken in rapid succession, developed, and finally projected again as a series of still pictures but under such conditions as to give the viewer an illusion of motion. The addition of a coördinated sound signal or track results in a sound motion picture.

This needs to be elaborated. It can be done by describing how a portion of a single scene from the motion picture *Daniel Boone* (Sound, B&W, 16 min., EBF) was made. The section of the film which will be described appears in the shooting script as follows:

Sequence B—NORTH CAROLINA

10. *Field, forest and sky* (*3–80*)
    NARRATOR: Here the land was cheap and bountiful, and the symbol of a man's ownership was a
11. *Tree being notched* (*3–83*)
    gash in a tree . . . The Tomahaute Claim!
12. *Daniel Boone shooting* (*7–90*)

After a script has been written, it is usually reviewed and checked by a subject-matter expert. In this case both a recognized historian and a museum curator checked the ideas and descriptions in the script.

Next the action called for in the script was rehearsed. Studio light experts arranged the lights so as to focus attention on the smoldering wick that ignited the exposed powder when Boone wanted to discharge the long rifle at a target.

THE PICTURE TRACK

The motion-picture camera, actually a device for recording a series of still pictures at 24 exposures per second, was then set into operation.

The result is shown in Fig. 14.1. Note how only slight changes in Boone's position appear from one still picture, or motion-picture "frame," to the next. This happens because the motion-picture camera rapidly "snaps" 24 still pictures or frames per second (16 frames for silent motion pictures). When these "still frames" are projected or flashed in sequence on a screen, the impression of life and motion is apparent to the viewer.

After the film has been developed, it is run through a motion-picture projector. This projector controls the direction of light so that light is projected through the series of frames onto a screen.

The projector diagram in Fig. 14.2 shows how 24 separately projected still pictures are flashed onto a screen each second. Each frame has a slightly different picture than the preceding one. A revolving shutter excludes the light during the time required for one frame to move out of the light beam and the next frame to move into it. Thus the screen is devoid of light for brief instances between projected still pictures.

The human eye is so organized that the image it sees persists in the mind for a brief period after the source of the impression, the actual stimulus, has disappeared. Because the normal eye is not constructed to detect these brief lightless intervals of less than $\frac{1}{50}$ of a second, but is rather influenced by the persistence of the image, the mind gains the impression that the screen is continuously lighted. Since the eye cannot detect when one picture is replaced by the next, a visual-mental impression of motion is received

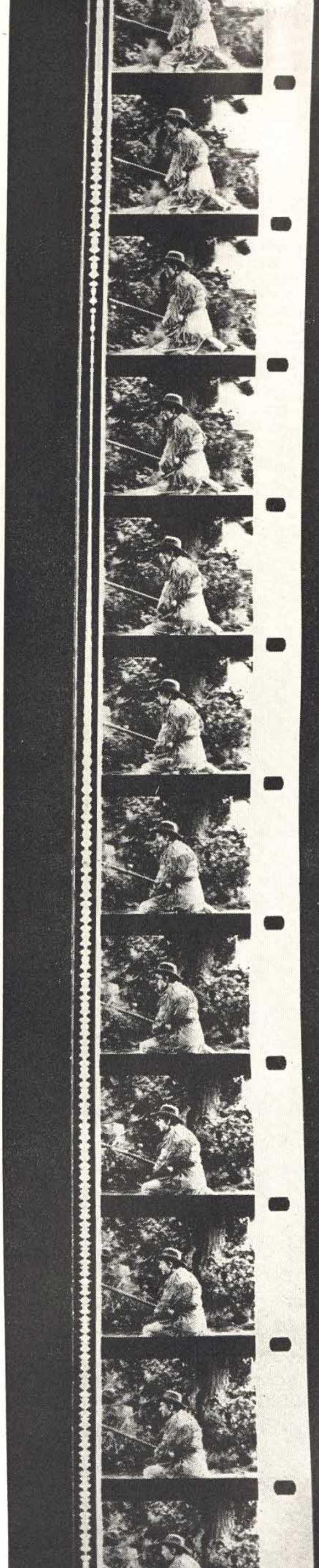

Fig. 14.1. It took Boone half a second to drop to a kneeling position as he prepared to shoot. How can you tell?

For this sequence the camera recorded 12 still pictures of the action at the rate of 24 exposures per second. As these "stills" are projected on the screen, note Boone's changing position frame by frame. Why is this? (Courtesy of Encyclopædia Britannica Films, Inc.)

in the brain. Thus, *the illusion of motion arises from what in reality is a rapidly changing sequence of still pictures.*

The faculty of the eye and brain to carry a delayed impression of a visual image for a very small fraction of a second is called persistence of retinal impression. This characteristic is present in varying degrees in people. However, it is this quality which has made possible today's motion-picture industry, both entertainment and instructional.

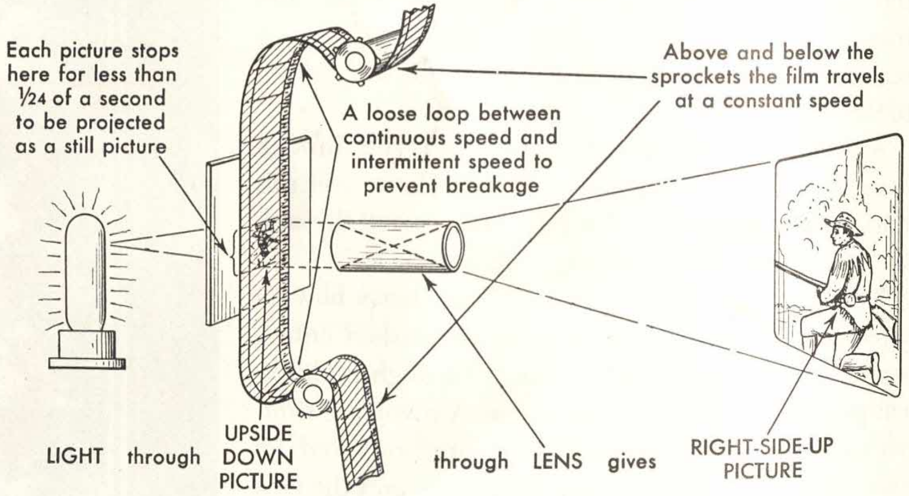
Each picture stops here for less than 1/24 of a second to be projected as a still picture
Above and below the sprockets the film travels at a constant speed
A loose loop between continuous speed and intermittent speed to prevent breakage
LIGHT through
UPSIDE DOWN PICTURE
through LENS gives
RIGHT-SIDE-UP PICTURE

Fig. 14.2. How the impression of motion is created by the projector. (Adapted from an Encyclopædia Britannica Films drawing.)

THE SOUND TRACK

The discovery of the photoelectric cell made sound recording on film possible. The first sound pictures represented a combination of sound recorded on phonograph disks that were later synchronized with the film. In 1928 the recording and reproduction of sound on film became a reality.[2]

Sound is photographed on photographic film. The two photographic negatives, picture and sound, are then printed by ordinary photographic processes on one positive. The resulting film, when run through a modern sound projector, gives rise to the visual-aural impression that we call a sound motion picture.

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[2] See *Sound Recording and Reproduction* (Sound, B&W, 10 min., EBF) for a detailed explanation.

When the sound for a motion-picture film is photographed, the sound waves are picked up by a microphone which converts the varying sound waves into similarly varying electric current. These current variations control a light valve. The light valve used in most sound recording is composed of two metallic ribbons which move apart or together in response to the variations in current. A constant beam of light is focused on this valve. The opening and closing of the valve allows similar light variations to be recorded as light and dark areas on photographic film.

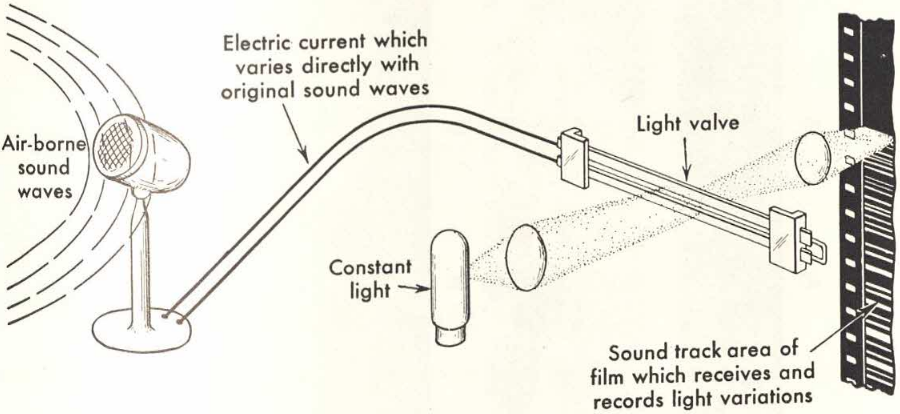
Electric current which varies directly with original sound waves
Air-borne sound waves
Light valve
Constant light
Sound track area of film which receives and records light variations

Fig. 14.3. How sound is recorded on film. Sound is changed first into electric impulses and then into variations in light that are recorded on the sound track. To understand how sound is later reproduced, see Fig. 14.5. (Based on an Encyclopædia Britannica Films photo.)

The sound-image film moves at a speed of 24 frames per second, the same speed at which the photographic film moves. The process is summarized in Fig. 14.3. The sound motion-picture film for the sequence, rifle action—Daniel Boone, is shown in Fig. 14.4.

The means by which sound is reproduced from a sound motion-picture film is practically the reverse of the way it is recorded (see Fig. 14.5). As the film moves through the sound motion-picture projector, a light of constant intensity is directed through the sound track on the film. The light passes through the track in lesser or greater amounts depending on the light variations in the sound track.

This residual variable light is directed toward a photoelectric cell which converts the variable intensities into similarly varying electric currents. These in turn set up corresponding movements in the loud-

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speaker diaphragm. Thus, the original sounds recorded when the sound track of the film was made are once again reproduced.

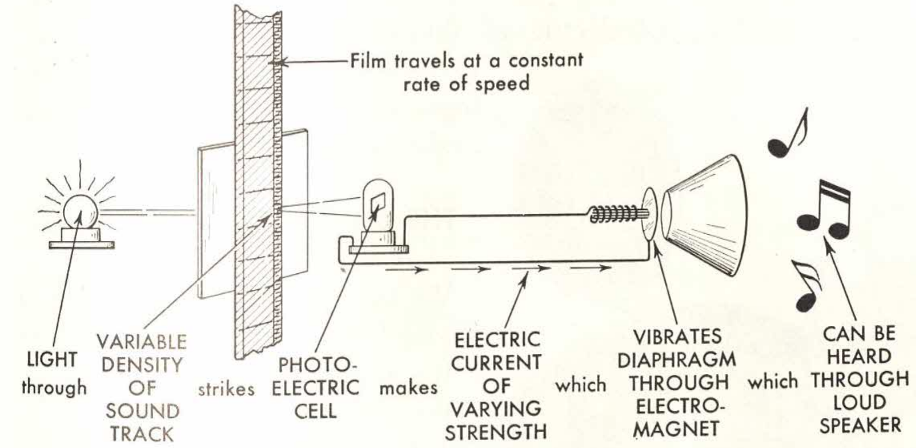
Film travels at a constant rate of speed
LIGHT through
VARIABLE DENSITY OF SOUND TRACK
strikes
PHOTO-ELECTRIC CELL
makes
ELECTRIC CURRENT OF VARYING STRENGTH
which
VIBRATES DIAPHRAGM THROUGH ELECTRO-MAGNET
which
CAN BE HEARD THROUGH LOUD SPEAKER

Fig. 14.5. How the sound projector reproduces sound. Note that this reverses the process shown in Fig. 14.3. (Based on an Encyclopædia Britannica Films drawing.)

THE SOUND MOTION-PICTURE PROJECTOR

The mechanism used to project sound motion-picture films is called a sound motion-picture projector (Fig. 14.6). It consists of three devices:

1. A device for passing light through a series of still photographs recorded on film. To do this the projector must move the film in front of a strong light source, and it must mechanically start and stop this film 24 times per second in front of this light.
2. A device to move the sound track portion of the film between a constant light source and a photoelectric cell in order to reproduce sound. The film must move at a constant speed so as to produce lifelike sound.
3. An amplification unit much like a small radio set which will amplify a tiny sound impulse to a degree of loudness that allows the listener to hear lifelike voices and sounds.

These three devices are present in all sound projectors in use today.

Though different in price, design, and efficiency, most modern sound motion-picture projectors are basically similar. Hence, a person who un-

Fig. 14.4. *Left:* The sound record is printed on one film. *Center:* The picture record is printed on another film. *Right:* The sound and picture records are finally printed on one film to produce the sound motion-picture film. Note the relationship of the sound track to the frames. (Courtesy of Encyclopædia Britannica Films, Inc.)

derstands that the film must be so threaded in the machine that (1) the stop-start action of the film can take place and a visual image be reproduced, and (2) the film will move smoothly and continuously between the lamp and the photoelectric cell, thus enabling clearly audible sound to be reproduced, should be able, regardless of inexperience, to use any modern projector.[3]

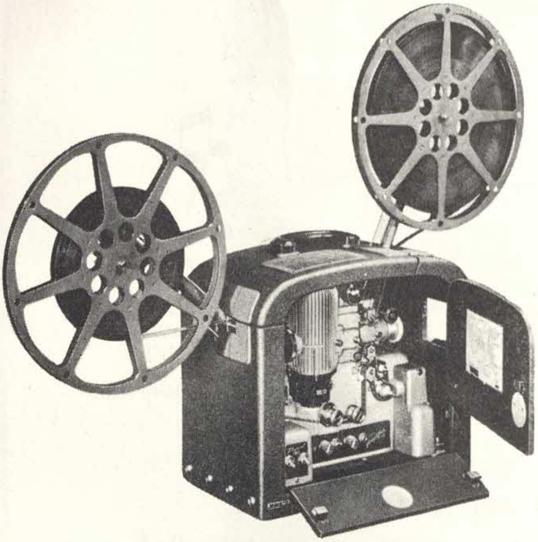

Fig. 14.6. A modern sound motion-picture projector. The best way to learn to operate a projector is to practice threading short lengths of used 16mm. sound film through the machine. Read the instructional manual, take the film in your hand, face the machine, and resolve to make it work. The worst you can do is ruin a few feet of film. (Courtesy of Bell & Howell Company, Chicago, Illinois.)

THE SOUND MOTION-PICTURE FILM IN INSTRUCTION

We now discuss the film, not as a physical and mechanical thing but as a teaching-learning material for instructional use.

The instructional sound motion-picture film is a means of recording the social and natural environment of man so that it may be later reproduced to create realistic, lifelike learning situations which closely simulate the original.

The effective teaching film allows the learner a maximum of personal identification with the situation recorded in sound and motion. The experience it re-creates may be only slightly removed from actual first-hand observation or participation. Such a film is a means of re-creating the environments of the world for conscious learning by the pupil.

DIRECT PHOTOGRAPHY

The recording "eye" of the camera and the "ear" of the microphone may be used in many ways in making teaching films. When the camera records things as you and I ordinarily see and hear them, a direct sound-photographic record is the result. Many motion-picture films useful in teaching the social studies, science, and language arts are direct photo-sound records.

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[3] For diagrammatic instructions in 16 mm. sound projection, see Amo De Bernardis, *The Audio-Visual Projectionist's Handbook*, Audio-Visual Publishers, Chicago, 1948; and Phillip Mannino, *ABC's of Visual Aids and Projectionist's Manual*, State College, Pa., 1946.

Such 16 mm. films as *Desert Nomads* (Sound, B&W, 22 min., United World), *Farmer-Fishermen of Norway* (Sound, B&W, 20 min., United World), *Farmers of India* (Sound, B&W, 20 min., United World), *Island Nation* (Sound, B&W, 20 min., United World), *Children of Holland* (Sound, B&W, 11 min., EBF), *Irish Children* (Sound, B&W, 10 min., EBF), *Pygmies of Africa* (Sound, B&W, 17 min., EBF) are outstanding examples of this type of film. Secure these or comparable films and arrange to preview them. Only through extensive previewing of these and similar films can you gain a realistic grasp of the value of direct sound and motion photography for instructional objectives and learning problems.

CHANGING-SPEED PHOTOGRAPHY

Some things occur too quickly or too slowly to be readily apparent to the human eye or ear. In such cases the camera can be slowed down or speeded up, the resulting film being projected at normal speed.

High-speed cameras are used to explain things which occur too rapidly to be grasped through normal vision. To photograph the action shown in *The Human Larynx and Vocal Cord* (Silent, B&W, 20 min., Bell Telephone), cameras which "snap" pictures at the rate of 4000 per second were used. When these pictures are projected at the usual speed—24 per second—the vocal folds function at a greatly reduced speed. But the viewer actually sees them and can study their structure and movement.

The reverse of this occurs when a camera records movement that is so slow that little or none of it is apparent. In the film *Plant Growth* (Sound, B&W, 10 min., EBF), single still pictures of a growing plant were taken at intervals of several minutes. Thus the plant's development over hours and days was recorded on photographs which, when projected at the rate of 24 per second, showed months of plant growth condensed into 10 minutes of viewing time.

The life story of plants and animals, the movement of glaciers, and the processes of erosion are slowly and carefully recorded by motion pictures over long periods of time. When these films are projected at normal speed, the viewer can see in a few minutes what has actually taken hours, days, or months. Such films as *Growth of Flowers* (Sound, Color, 10 min., Coronet), *Sensitivity of Plants* (Sound, B&W, 14 min., UFA), *Butterflies* (Sound, B&W, 10 min., EBF), and *Reactions in Plants and Animals* (Sound, B&W, 11 min., EBF), as well as the ones already mentioned, should be previewed and studied in order fully to appreciate the value of changing-speed photography.

PHOTOMICROGRAPHY

The use of the motion-picture camera to photograph anything that can be seen has been mentioned. However, the teacher of science, home economics, or agriculture is often interested in seeing *beyond the limits of human vision.*

One way of seeing things too small for observation by our eye is to use an enlarging lens or a microscope. Today the camera and the microscope can be combined to record by motion photography things that are too small for us to see. This process is usually called photomicrography or microphotography.

The home economics teacher who wishes to explain to her students the relationship of yeast growth to bread making can show a photomicrographic record, a motion picture of the growth of a colony of yeasts and molds, to her class. A 16 mm. motion picture *Mold and Yeast* (Sound, B&W, 10 min., EBF), and also *Microscopic Plant Life in the Bakeshop* (Silent, B&W, 30 min., American Society of Bakery Engineers) enable every student to see yeasts bud and form the carbon dioxide which "raises bread dough."

Similarly, photomicrography permits the science teacher actually to observe the growth and division of human cells in *Cell Division* (Silent, B&W, 15 min., Wistar Institute) and *The Cell* (Sound, B&W, 10 min., Coronet). In the science classroom, while viewing *Life in a Drop of Water* (Sound, B&W, 10 min., Coronet), pupil and teacher can see the life cycle of the amoeba and other protozoans unfolded in graphic and understandable sequences of vastly enlarged images.

Children can now watch tiny insects, magnified to two or four feet in height, grow and develop. These processes are no longer a mystery after photomicrographic records, such as *Honeybee* (Sound, B&W, 11 min., EBF), *House Fly* (Sound, B&W, 11 min., EBF), and *Mosquito* (Sound, B&W, 10 min., EBF), are studied.

Teacher and pupils can see beyond the former boundaries of human vision. They can watch the growth and reproduction cycles of organisms too small for the naked eye to observe. Through photomicrography, "pictures" three feet high of microscopic plant and animal life "move and live" on the motion-picture screen.

ANIMATION

A teacher often encounters learning problems that demand information beyond what can be observed in real life. Learners are interested in investigating ideas which do not exist in concrete form. While much of the curriculum is concerned with the physical, concrete aspects of the environment, there are broad fields of information apart from the real and tangible.

If motion and sound are effective in explaining tangible, real things, visualization should be even more effective in explaining theories, ideas, and hypotheses. Animation photography serves this latter area of learning.

Animation is the process by which a concept is visualized. It is usually used to visualize a "hard to explain" concept. Abstract ideas can often be made concrete through analogy. This has been well explained by an educator-animator, in terms of jet propulsion (see Fig. 14.7):

> Where the live-action camera is the counterpart of the physical eye, the animation camera represents the mind's eye. Live-action will reproduce anything that can be seen—animation will produce anything that can be imagined.
>
> Teachers tell us that in the realm of the abstract, if a picture is worth a thousand words, a compelling analogy is worth five thousand. And the imaginative analogy is animation's meat and drink. For example: the principle of jet propulsion derives from Newton's Third Law of Motion, to the effect that "every action produces a reaction which is equal in force and opposite in direction." This abstract principle was visualized in the film in terms of an escaping toy balloon, which as the air escaped through its open vent, drove forward in reaction to the rearward discharge of air. Then an essential sidelight—that this forward motion really resulted from action-and-reaction, and not from the push of the gases on the surrounding air—was visualized by the firing of a pistol through obstacles of varying density (air, water, and a vacuum), wherein the recoil of the pistol was shown diagrammatically to be, in all three cases, exactly the same. Finally, to draw the conclusion visually, on the screen, rather than verbally, in the narration, animation used its peculiar power to tie analogy and actuality together in the same scene by superimposing a continuously firing pistol on the jet outlet of the moving airplane itself. When the sequence

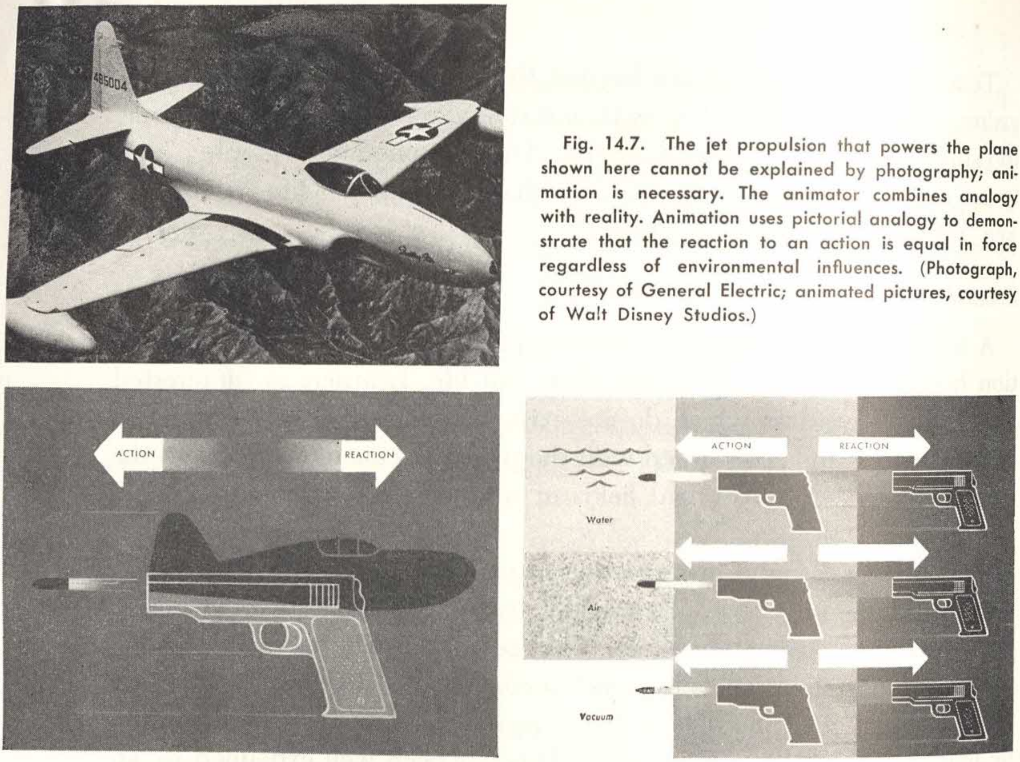

Fig. 14.7. The jet propulsion that powers the plane shown here cannot be explained by photography; animation is necessary. The animator combines analogy with reality. Animation uses pictorial analogy to demonstrate that the reaction to an action is equal in force regardless of environmental influences. (Photograph, courtesy of General Electric; animated pictures, courtesy of Walt Disney Studios.)

was finished, analogy had embedded an abstraction in the concreteness of the viewer's own familiar experience.[4]

The 16 mm. sound films abound with examples of animation. The science teacher who is dealing with aeronautical terminology and techniques can use animated films to explain elementary concepts such as yaw, pitch, and roll; such a film is *Theory of Flight* (Sound, B&W, 11 min., EBF). In a more advanced lesson he may have to discuss the principles of the gyrosyn compass; this depends almost entirely on theoretical explanation. Here the film *Gyrosyn Compass* (Sound, B&W, 25 min., Sperry Gyroscope Company) will be helpful.

The home economist who wishes to explain the relationship between photosynthesis and food energy can find an interesting and clear explanation of leaf chemistry in the film *Gift of Green* (Sound, Color, 18 min., Sugar Information, Inc.).

Animation has increased the teaching power of the film many times. The animated sound film can explain anything that exists in man's mind.

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[4] Carl Nater, "Animation in Education," *See and Hear*, May, 1947, p. 13.

There are few areas of human thought or learning today which are not well and effectively served by visual animation.

Splendid examples of film animation are offered by such films as *Jet Propulsion* (Sound, Color, 15 min., GE), *Theory of Flight* (Sound, B&W, 11 min., EBF), *Fuels and Heat* (Sound, B&W, 11 min., EBF), *Gift of Green* (Sound, Color, 18 min., Sugar Information, Inc.), *Work of Kidneys* (Sound, B&W, 11 min., EBF), *Nervous System* (Sound, B&W, 11 min., EBF), *Adventures of Junior Raindrop* (Sound, Color, 10 min., USDA).

Previewing such films as the above will prove most helpful in gaining an understanding of animation. Only through seeing and hearing explanations given by sound motion-picture animation can full appreciation of the strength of this photographic medium be gained.

To summarize, many of the physiological limitations of man's ability to observe can be overcome by means of the 16 mm. sound motion-picture film:

1. Things which exist in understandable but inaccessible form can be photographed from life by means of direct photography.
2. Things which are too small to be seen can be made visible by photomicrography.
3. Things which happen too rapidly for normal observation can be slowed down to comprehensible speed, and vice versa.
4. Things which are too abstract, too large, too hidden, or too theoretical for effective comprehension by the average learner can be visualized by animation and portrayed on film.

The 16 mm. sound motion-picture film can bring the entire world into the classrooms of the most remote mountain village. No idea or phenomenon is too remote, inaccessible, or abstract for graphic and understandable explanation through this new medium of communication.

CLASSIFICATION OF 16 MM. SOUND MOTION-PICTURE FILMS[5]

Many classifications have been made of motion-picture films. Because the present discussion is concerned with the school use of sound films, films which are described here will be classified as (1) basic teaching films and (2) supplementary teaching films.

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[5] For a comprehensive list of sources of 16 mm. motion-picture films, see pp. 538–545.

Basic teaching films are usually made specifically for use in carefully designated curriculum areas. These films are planned and produced to improve teaching.

Supplementary teaching films are invariably made for some purpose other than enriching and implementing the school curriculum. Because most films have educational values, untold numbers of those made for extraschool purposes contain information which is of value in improving regular school learning situations.

Supplementary teaching films originate from many sources. They may be grouped into three classes: (1) documentary films, (2) sponsored films, and (3) entertainment films.

BASIC TEACHING FILMS

The producer of a teaching film is usually a student of school curricula. He is well aware of the values of a film in relation to instructional problems. He believes that when a subject demands visualization, motion, and natural or environmental sounds in order to be understood by the learner, the 16 mm. sound picture can make a contribution to both teacher and learner.

A teaching film may be described in terms of several of its most inherent and valuable characteristics.

1. *It visualizes.*

Much of the material studied in school demands to be examined, manipulated, and *seen* in order to be understood. The effective teaching film completely and understandably visualizes its subject through good photography; color is used if necessary for better understanding. It visualizes also through charts, diagrams, and animation if these techniques are needed for clear, understandable explanations.

2. *It employs motion.*

Things that move or that possess action as an identifying characteristic make effective motion-picture subjects.

A motion picture which explains the action of a jet engine will show the parts of the engine in action, if it is an effective film.

A film that is merely a series of architectural views is not truly a motion-picture film. Such views are better presented on still pictures or slides.

Effective motion pictures portray things and processes by means of description, movement, and action.

3. *It includes environmental sounds.*

The effective teaching film documents as much of the original environment as possible. It records color, form, and action, but it also records meaningful environmental sounds. Such sounds as the whir of machinery, the lapping of water, the characteristic noises of a railroad yard or a factory interior, the lowing of cattle, etc., add great realism to motion-picture visualization.

4. *It employs narration.*

Helpful explanatory narration accompanying motion photography is useful in directing the learner's attention and establishing his understanding of visualized relationships. Such narration is inherently related to the visual content; it is not a "lecture" that accompanies a photographic story.

5. *It is related to the school curriculum.*

The teaching film is definitely related to the content and subject matter of the school curriculum. The film exists because it can provide understandable explanations by means of visualization and sound and thus make unique contributions to classroom learning.

Finally, the teaching film avoids the curricular areas where it is less effective as a teaching device than other means of presentation.

A teaching film has been described as follows:

> The "educational sound film" implies the following points . . . (1) The sound film should include environmental and interpretive sounds appropriate to the action so as to make the content of the film more realistic. (2) The visual concepts included should be those which ordinarily cannot be interpreted to the student in the classroom. (3) The sound film should interpret, by a blending of the foregoing two factors, such audio-visual concepts as will stimulate the learner's eye and ear and make it possible for him to become aware of the whole situation portrayed just as if he were actually there at the scene of action observing a segment of life in all its completeness.[6]

The producer of a teaching film is realistic in recognizing that if a film does no more than a good teacher can do with the instructional materials already in use, he had better turn his creative efforts elsewhere.

Fortunately the high cost of production makes it necessary to consider very carefully all the foregoing characteristics. Teachers are becoming more and more aware of the true contribution of the teaching film in improving instruction. The general level of effectiveness of these films is on the upswing. These two factors work to the advantage of the school and promise increasing numbers of high-quality teaching films.

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[6] Walter Arno Wittich and John Guy Fowlkes, *Audio-Visual Paths to Learning*, Harper, New York, 1946, p. 29.

Today teaching films have been produced in virtually all curriculum areas; some of these films are listed below. The best way to become acquainted with them is to preview them. As you view them keep the characteristics of an effective teaching film in mind. The most important question to ask after previewing a film is: Does this film make a contribution to an instructional problem beyond what can be accomplished with the instructional materials already in use?

Primary Grade Films (Fig. 14.8)

Adventures of Bunny Rabbit, Sound, B&W, 11 min., EBF.[7]

Adventuring Pups, Sound, B&W, 8 min., YA.

Chucky Lou, Sound, Color, 10 min., Indiana Univ.

Circus Animals, Sound, Color, 10 min., Academy.

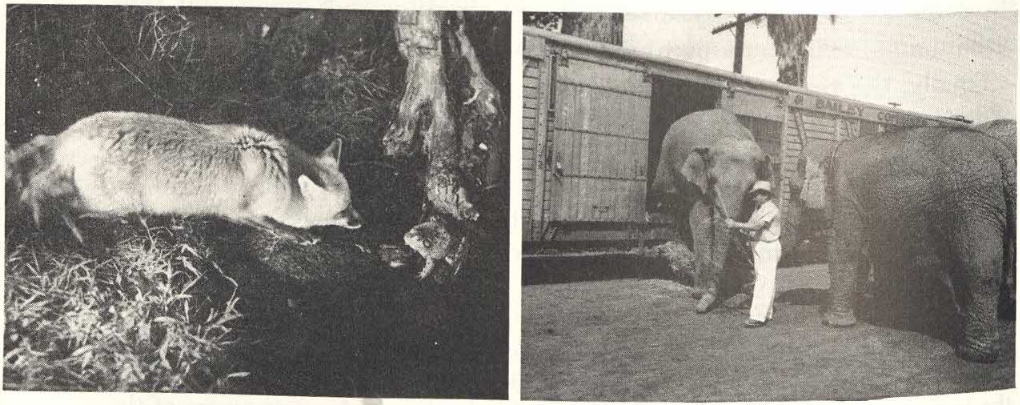

Fig. 14.8. (*Left:* From the Encyclopædia Britannica Film *The Fox and the Rooster. Right:* From *Circus Animals,* courtesy of Academy Films.)

Animal Neighbors, Sound, Color, 10 min., Coronet.

Animals Growing Up, Sound, B&W, 10 min., EBF.

Autumn on the Farm, Sound, Color, 10 min., EBF.

Baby Animals, Sound, B&W, 8 min., YA.

Circus People, Sound, Color, 11 min., Academy.

Elephants, Sound, B&W, 11 min., EBF.

Farm Animals, Sound, B&W, 11 min., EBF.

Fire Engines!! Sound, Color, 11 min., Tompkins.

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[7] For source abbreviations, see pp. 538–545.

Firemen, Sound, B&W, 11 min., EBF.

Fox and the Rooster, Sound, B&W, 11 min., EBF.

Hare and the Tortoise, Sound, B&W, 11 min., EBF.

Honest Woodsman, Sound, B&W, 10 min., Coronet.

Johnny Learns His Manners, Sound, B&W, 20 min., Pictorial.

Let's Play Safe, Sound, Color, 10 min., Portafilms.

Mother Goose Stories, Sound, Color, 10 min., Bailey.

Punch and Judy, Sound, Color, 18 min., Gateway.

Red Hen, Sound, Color, 10 min., Barr.

Rikki—Baby Monkey, Sound, B&W, 11 min., EBF.

Safety to and from School, Sound, B&W, 10 min., YA.

Seven Little Ducks, Sound, Color, 10 min., Bailey.

Spring on the Farm, Sound, Color, 10 min., EBF.

Teddy Bears at Play, Sound, B&W, 5 min., United World.

Three Little Kittens, Sound, B&W, 11 min., EBF.

Visit with Cowboys, Sound, B&W, 11 min., EBF.

Wonders in Your Own Backyard, Sound, Color, 10 min., Churchill-Wexler.

Intermediate Grade Films

ARITHMETIC (Fig. 14.9)

Borrowing in Subtraction, Sound, B&W, 17 min., TFC.

Decimal Fractions, Sound, B&W, 11 min., Johnson-Hunt.

Meaning of Long Division, Sound, B&W, 10 min., EBF.

Meaning of Percentage, Sound, B&W, 10 min., YA.

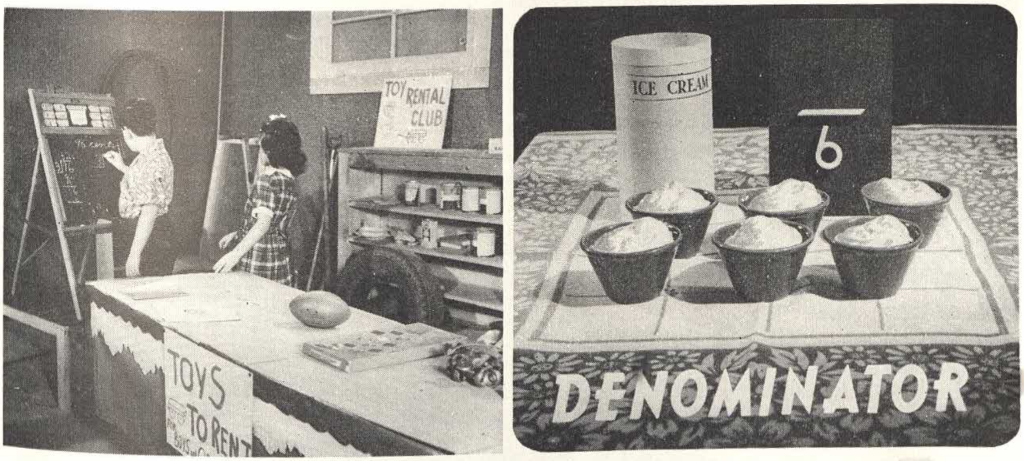


Fig. 14.9. (Left: From *Division Is Easy,* courtesy of Coronet Instructional Films. Right: From *Introduction to Fractions,* courtesy of Johnson Hunt Productions.)

Division Is Easy, Sound, B&W, 10 min., Coronet.

How to Subtract Fractions, Sound, B&W, 11 min., Johnson-Hunt.

Introduction to Fractions, Sound, B&W, 11 min., Johnson-Hunt.

Multiplication Is Easy, Sound, B&W, 11 min., Coronet.

Origin of Mathematics, Sound, B&W, 10 min., United World.

Percentage, Sound, B&W, 11 min., Johnson-Hunt.

Subtraction Is Easy, Sound, B&W, 10 min., Coronet.

Teen Numbers, Sound, B&W, 10 min., YA.

Using the Bank, Sound, B&W, 10 min., EBF.

What Are Decimals, Sound, B&W, 10 min., Instructional.

LANGUAGE ARTS (Fig. 14.10)

Alaska—Northwestern, Sound, B&W, 20 min., United World.

Alcott, Louisa May, Sound, B&W, 16 min., EBF.

Animals of the Zoo, Sound, B&W, 11 min., EBF.

Appreciating Our Parents, Sound, B&W, 10 min., Coronet.

Circus Day in Our Town, Sound, B&W, 17 min., EBF.

Cooper, James Fenimore, Sound, B&W, 17 min., EBF.

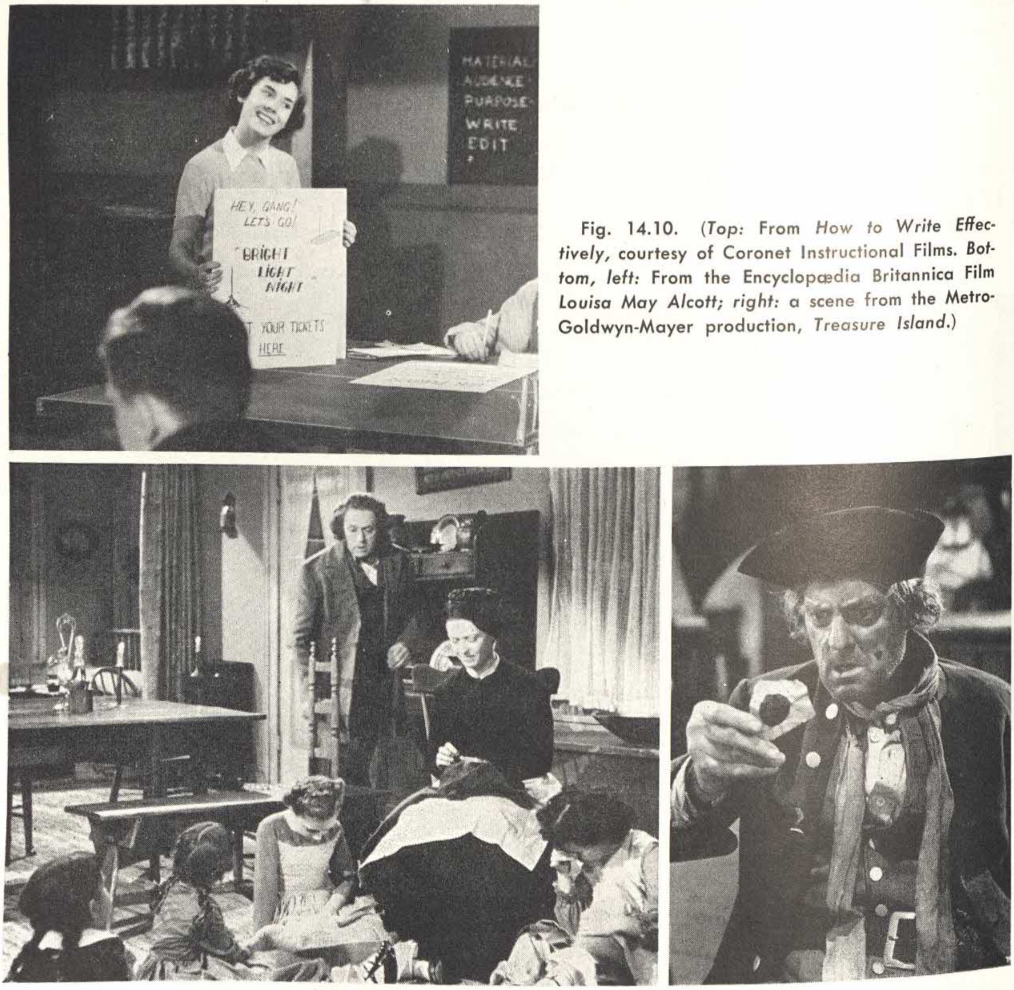


Fig. 14.10. (*Top:* From *How to Write Effectively,* courtesy of Coronet Instructional Films. *Bottom, left:* From the Encyclopædia Britannica Film *Louisa May Alcott; right:* a scene from the Metro-Goldwyn-Mayer production, *Treasure Island.*)

Food Store, Sound, B&W, 10 min., EBF.

Frisky, the Calf, Sound, B&W, 10 min., Coronet.

Holmes, Oliver Wendell, Sound, B&W, 16 min., EBF.

How to Observe, Sound, B&W, 10 min., Coronet.

How to Write Effectively, Sound, B&W, 9 min., Coronet.

Improve Your Reading, Sound, B&W, 10 min., Coronet.

Longfellow, Henry Wadsworth, Sound, B&W, 16 min., EBF.

Loon's Necklace, Sound, Color, 10 min., EBF.

Making Books, Sound, B&W, 10 min., EBF.

Oriental City (Canton, China), Sound, B&W, 20 min., United World.

Pig Tales, Sound, Color, 10 min., Frith.

Punctuation—Mark Your Meaning, Sound, B&W, 10 min., Coronet.

Puppetry—String Marionettes, Sound, B&W, 10 min., EBF.

Spelling Is Easy, Sound, B&W, 11 min., Coronet.

Timothy's Quest, Sound, B&W, 33 min., TFC.

Treasure Island, Sound, B&W, 44 min., TFC.

NATURAL SCIENCE (Fig. 14.11)

African Fauna, Sound, Color, 11 min., Hoefler.

Atmosphere and Its Circulation, Sound, B&W, 11 min., EBF.

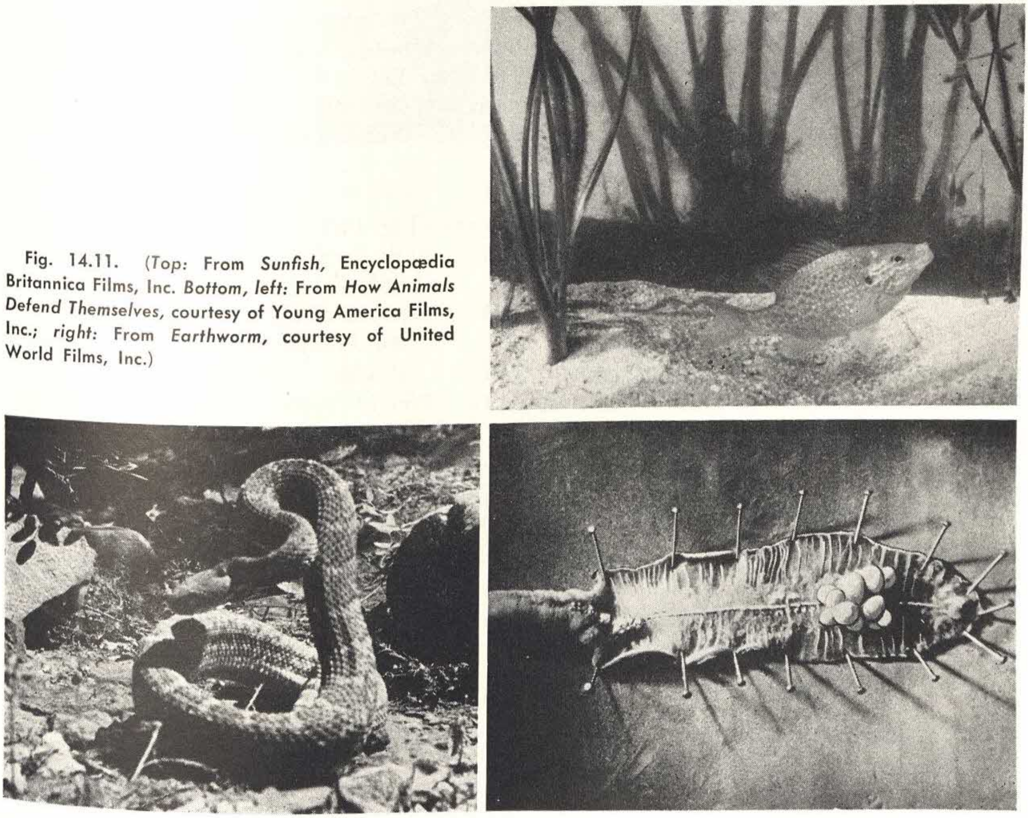
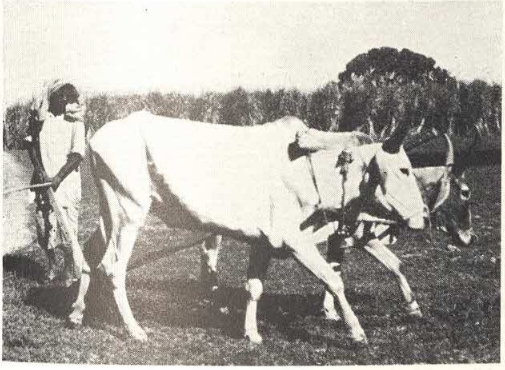


Fig. 14.11. (*Top:* From *Sunfish,* Encyclopædia Britannica Films, Inc. *Bottom, left:* From *How Animals Defend Themselves,* courtesy of Young America Films, Inc.; *right:* From *Earthworm,* courtesy of United World Films, Inc.)

Beach and Sea Animals, Sound, B&W, 11 min., EBF.
Birds of the Dooryards, Sound, Color, 11 min., Coronet.
Bluebird, Sound, Color, 10 min., Heidenkamp.
Camouflage in Nature Through Form and Color Matching, Sound, Color, 10 min., Coronet.
Cheese and Cheese Making, Sound, Color, 10 min., Kruse.
Clouds, Sound, B&W, 11 min., USDC, Weather Bureau.
Common Animals of the Woods, Sound, B&W, 10 min., EBF.
Day and Night, Sound, B&W, 9 min., United World.
Earthworm, Sound, B&W, 18 min., United World.
Elements of Electrical Circuits, Sound, B&W, 10 min., EBF.
Flowers at Work, Sound, B&W, 10 min., EBF.
Forest and Conservation, Sound, Color, 10 min., Coronet.
Honeybee, Sound, B&W, 11 min., EBF.
How Animals Defend Themselves, Sound, B&W, 8 min., YA.
How Nature Protects Animals, Sound, B&W, 11 min., EBF.
Life in a Drop of Water, Sound, B&W, 10 min., Coronet.
Machines Do Work, Sound, B&W, 10 min., YA.
Magnets, Sound, B&W, 10 min., YA.
Monarch Butterfly, Sound, Color, 10 min., Instructional.
Monarch Butterfly Story, Sound, Color, 10 min., EBF.
Plant Growth, Sound, B&W, 11 min., EBF.
Snapping Turtle, Sound, B&W, 9 min., EBF.
Sunfish, Sound, B&W, 11 min., EBF.
Water in the Air, Sound, B&W, 11 min., Instructional.
What Is Sound? Sound, B&W, 11 min., YA.
What Makes Things Float? Sound, B&W, 9 min., Films, Inc.

Social Studies (Fig. 14.12)

Airplane Trip, Sound, B&W, 11 min., EBF.
Animals in Modern Life, Sound, B&W, 11 min., EBF.
Cattleman, Sound, B&W, 11 min., EBF.
Children of the Alps, Sound, B&W, 11 min., EBF.
City Fire Fighters, Sound, B&W, 10 min., Coronet.
Colonial Children, Sound, B&W, 10 min., EBF.
Country Town, Sound, B&W, 16 min., BIS.
Cowboy, Sound, Color, 9 min., Barr.
Desert, Sound, B&W, 10 min., Barr.
Desert Nomads, Sound, B&W, 22 min., United World.
Early Settlers of New England, Sound, B&W, 11 min., EBF.
Farmers of India (Middle Ganges Valley), Sound, B&W, 22 min., United World.
Freight Train, Sound, B&W, 10 min., Barr.
French Children, Sound, B&W, 10 min., EBF.
Iron Mining, Sound, B&W, 10 min., Academy.
Maps and Their Meaning, Sound, Color, 15 min., Academy.
Mexican Children, Sound, B&W, 11 min., EBF.
Mississippi River—Upper, Sound, Color, 14 min., Academy.



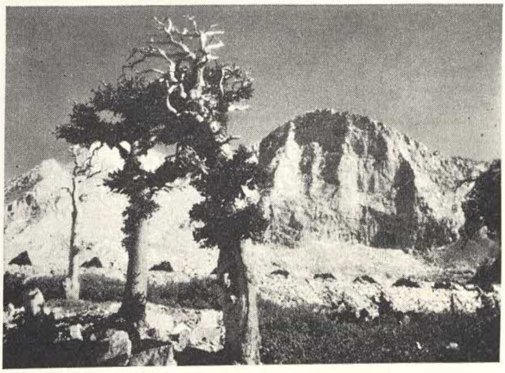


Fig. 14.12. (*Top:* From *Pioneers of the Plains,* Encyclopædia Britannica Films, Inc. *Bottom, left:* From *Farmers of India,* courtesy of United World Films, Inc.; *right:* From *Maps and Their Meaning,* courtesy of Academy Films.)

Nile River Basin and People of the Lower Valley, Sound, Color, 17 min., Academy.

Norwegian Children, Sound, B&W, 11 min., EBF.

On Mediterranean Shores, Sound, B&W, 22 min., United World.

Peiping Family, Sound, B&W, 20 min., International Film Foundation.

Pioneers of the Plains, Sound, B&W, 10 min., EBF.

Safe in Port, Sound, Color, 17 min., Frith.

Sampan Family, Sound, B&W, 16 min., International Film Foundation.

U.S.A.—Community and Its Citizens, Sound, B&W, 20 min., United World.

High-School Level Films

ENGLISH (Fig. 14.13)

David Copperfield: The Boy, Sound, B&W, 42 min., TFC.

David Copperfield: The Man, Sound, B&W, 45 min., TFC.

Describing an Incident, Sound, B&W, 10 min., Coronet.

England: Background of Literature, Sound, B&W, 10 min., Coronet.

France: Background of Literature, Sound, B&W, 11 min., Coronet.

Home Town Paper, Sound, B&W, 22 min., National Film Board of Canada.

House of the Seven Gables, Sound, B&W, 40 min., TFC.

How to Judge Facts, Sound, B&W, 10 min., Coronet.

How to Read a Book, Sound, B&W, 10 min., Coronet.

How to Study, Sound, Color, 10 min., Coronet.

Irving, Washington, Sound, B&W, 18 min., EBF.

Julius Caesar, Sound, B&W, 19 min., Eastin.

Pride and Prejudice, Sound, B&W, 45 min., TFC.

Romance of Robert Burns, Sound, Color, 16 min., TFC.

Scotland—Background of Literature, Sound, B&W, 10 min., Coronet.

Shakespeare, Memories of, Sound, B&W, 26 min., Hoffberg.

Fig. 14.13. (*Left:* From *David Copperfield,* Metro-Goldwyn-Mayer. *Right:* From *Describing an Incident,* courtesy of Coronet Instructional Films.)

Know Your Library, Sound, B&W, 10 min., Coronet.

Lady or the Tiger? Sound, B&W, 10 min., TFC.

Les Misérables, Sound, B&W, 45 min., TFC.

Mutiny on the Bounty, Sound, B&W, 44 min., TFC.

New England: Background of Literature, Sound, B&W, 10 min., Coronet.

Shakespeare, William—Background for His Works, Sound, B&W, 13 min., Coronet.

Speeding Your Reading, Sound, B&W, 10 min., Teaching Aids.

Tale of Two Cities, Sound, B&W, 45 min., TFC.

Whittier, John Greenleaf, Sound, B&W, 16 min., EBF.

Why Punctuate, Sound, B&W, 10 min., YA.

Guidance (Fig. 14.14)

Act Your Age, Sound, B&W, 13 min., Coronet.

Aptitudes and Occupations, Sound, B&W, 16 min., Coronet.

Bookkeeping and Accounting, Sound, B&W, 11 min., VGF.

Brick and Stone Mason, Sound, B&W, 11 min., VGF.

Counseling—Its Tools and Techniques, Sound, B&W, 20 min., VGF.

Developing Friendships, Sound, B&W, 11 min., Coronet.

Developing Responsibilities, Sound, B&W, 10 min., Coronet.

Family Circles, Sound, B&W, 29 min., McGraw-Hill.

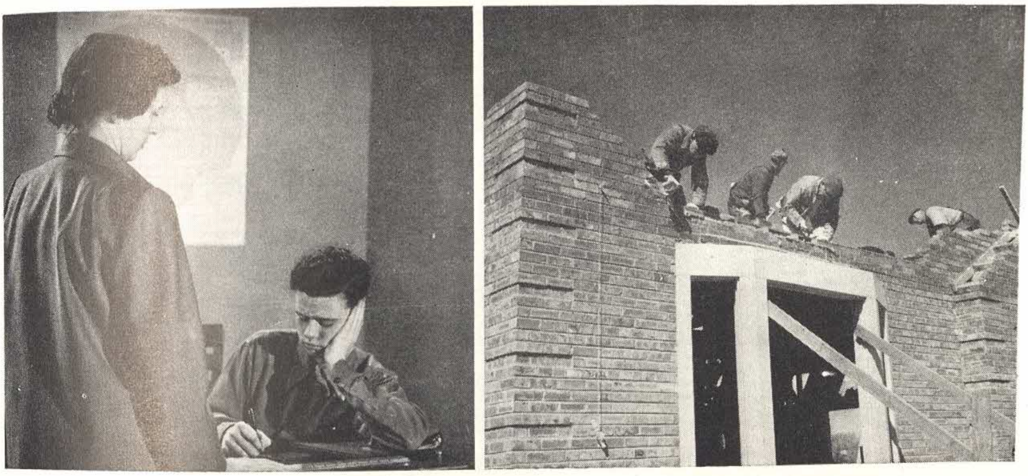


Fig. 14.14. (*Left:* From *Act Your Age*, courtesy of Coronet Instructional Films. *Right:* From *Brick and Stone Mason*, Courtesy of Carl F. Mahnke Productions.)

Furniture Craftsmen, Sound, B&W, 11 min., EBF.

How Honest Are You? Sound, B&W, 13 min., Coronet.

How to Be Well Groomed, Sound, Color, 11 min., Coronet.

Improve Your Personality, Sound, B&W, 11 min., Coronet.

Journalism, Sound, B&W, 11 min., VGF.

Machine Maker, Sound, B&W, 11 min., EBF.

Marriage for Moderns Series, Sound, B&W, 5 films, approx. 20 min. each, McGraw-Hill.

More Dates for Kay, Sound, B&W, 9 min., Coronet.

Over-Dependency, Sound, B&W, 32 min., National Film Board of Canada.

Quarterback, Sound, B & W, 30 min., National Association of Manufacturers.

Secretary's Day, Sound, B&W, 11 min., Coronet.

HEALTH AND PHYSIOLOGY (Fig. 14.15)

Alcohol and the Human Body, Sound, B&W, 14 min., EBF.

Alimentary Tract, Sound, B&W, 11 min., EBF.

Body Care and Grooming, Sound, B&W, 17 min., McGraw-Hill.

Body Fights Bacteria, Sound, B&W, 14 min., McGraw-Hill.

Cancer—You, Time and Cancer, Sound, Color, 16 min., American Cancer Society.

Ear and Hearing, Sound, B&W, 10 min., EBF.

Emotional Health, Sound, B&W, 21 min., McGraw-Hill.

Endocrine Glands, Sound, B&W, 11 min., EBF.

Feeling of Hostility, Sound, B&W. 25 min., International Film Bureau.

Foods and Nutrition, Sound, B&W, 11 min., EBF.

Fundamentals of Diet, Sound, B&W, 10 min., EBF.

Growing Girls, Sound, B&W, 10 min., EBF.

Fig. 14.15. (From Encyclopædia Britannica Film, *The Ears and Hearing.*)

Help Wanted, Sound, B&W, 31 min., Johnson & Johnson.

Human Hair, Sound, B&W, 9 min., Bray.

Human Reproduction, Sound, B&W, 23 min., McGraw-Hill.

Immunization, Sound, B&W, 10 min., EBF.

Improving Your Posture, Sound, B&W, 10 min., Coronet.

Magic Alphabet, Sound, B&W, 11 min., TFC.

Our Teeth, Sound, B&W, 11 min., KB.

Tuberculosis: Its Diagnosis, Treatment and Control, Sound, B&W, 11 min., EBF.

Your Ears, Sound, B&W, 10 min., YA.

HOME ECONOMICS (Fig. 14.16)

Are You Popular, Sound, B&W, 10 min., Coronet.

Arranging the Tea Table, Sound, Color, 7 min., Instructional.

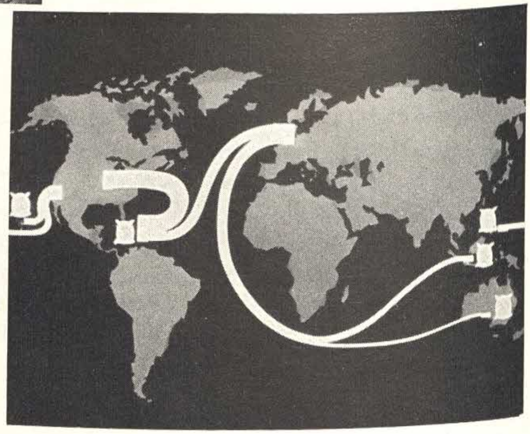


Fig. 14.16. (*Top:* From *Child Care and Development,* a McGraw-Hill Text-Film. *Bottom, left:* From *Cooking: Terms and What They Mean,* courtesy of Young America Films; *right:* From *Distribution of Foods,* Encyclopædia Britannica Films, Inc.)

Bread Making, Sound, Color, 11 min., Hoefler.

Child Care and Development, Sound, B&W, 17 min., McGraw-Hill.

Consumption of Foods, Sound, B&W, 10 min., EBF.

Cooking Series, Sound, B&W, 39 min., YA.

Defending the City's Health, Sound, B&W, 11 min., EBF.

Distributing America's Goods, Sound, B&W, 10 min., EBF.

Distribution of Foods, Sound, B&W, 10 min., EBF.

Foods and Nutrition, Sound, B&W, 11 min., EBF.

Freeze It, Sound, Color, 20 min., Instructional.

Home Nursing, Sound, B&W, 10 min., EBF.

Home Safe Home, Sound, B&W, 10 min., National Safety Council.

Principles of Baking: Flour Mixtures, Sound, B&W, 10 min., EBF.

Principles of Cooking: Meats and Vegetables, Sound, B&W, 10 min., EBF.

Principles of Home Canning, Sound, B&W, 11 min., EBF.

Principles of Refrigeration, Sound, B&W, 20 min., United World.

Production of Foods, Sound, B&W, 10 min., EBF.

Sewing Films, Sound, B&W, 40 min., YA.

Step-Saving Kitchen, Sound, Color, 14 min., USDA.

Wise Buying, Sound, B&W, 10 min., Coronet.

You and Your Family, Sound, B&W, 10 min., Look.

MATHEMATICS (Fig. 14.17)

Angles, Sound, B&W, 11 min., KB.

Areas, Sound, B&W, 12 min., KB.

Circle, Sound, B&W, 11 min., KB.

Congruent Figures, Sound, B&W, 11 min., KB.

Geometry in Action, Sound, B&W, 9 min., Library Films.

How to Find the Answer, Sound, B&W, 10 min., Coronet.

Language of Graphs, Sound, B&W, 10 min., Coronet.

Language of Mathematics, Sound, B&W, 10 min., Coronet.

Meaning of Pi, Sound, B&W, 10 min., Coronet.

Pythagorean Theorem, Sound, B&W, 10 min., KB.

Your Family Budget, Sound, B&W, 10 min., Coronet.

Your Thrift Habits, Sound, B&W, 10 min., Coronet.

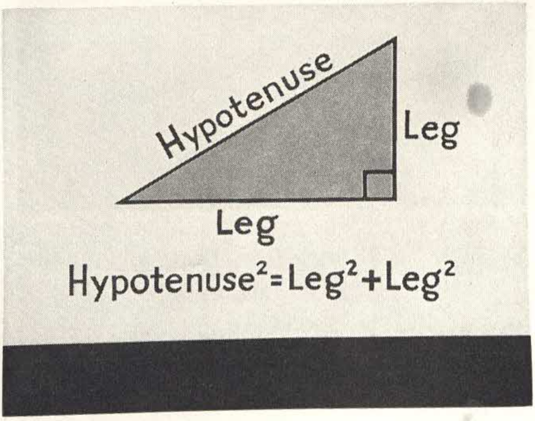


Fig. 14.17. (From *Pythagorean Theorem,* courtesy of Knowledge Builders.)

MUSIC (Fig. 14.18)

Carmen, Sound, B&W, 21 min., Official.

Emanuel Feuermann, Sound, B&W, 11 min., Library Films.

Fiddle-de-dee, Sound, Color, 5 min., International Film Bureau.

Great Waltz, Sound, B&W, 20 min., TFC.

Instruments of the Orchestra, Sound, B&W, 22 min., Eastin.

Fig. 14.18. (From *The Woodwind Choir,* Encyclopædia Britannica Films, Inc.)

Naughty Marietta, Sound, B&W, 34 min., TFC.

Percussion Group, Sound, B&W, 11 min., EBF.

Songs of Stephen Foster, Sound, B&W, 10 min., TFC.

Story of the Violin, Sound, B&W, 10 min., Hoffberg.

Symphony Orchestra, Sound, B&W, 10 min., EBF.

Woodwind Choir, Sound, B&W, 11 min., EBF.

SCIENCE (Fig. 14.19)

Alcohol and the Human Body, Sound, B&W, 14 min., EBF.

Ants, Sound, B&W, 10 min., EBF.

Cell—Structural Unit of Life, Sound, Color, 10 min., Coronet.

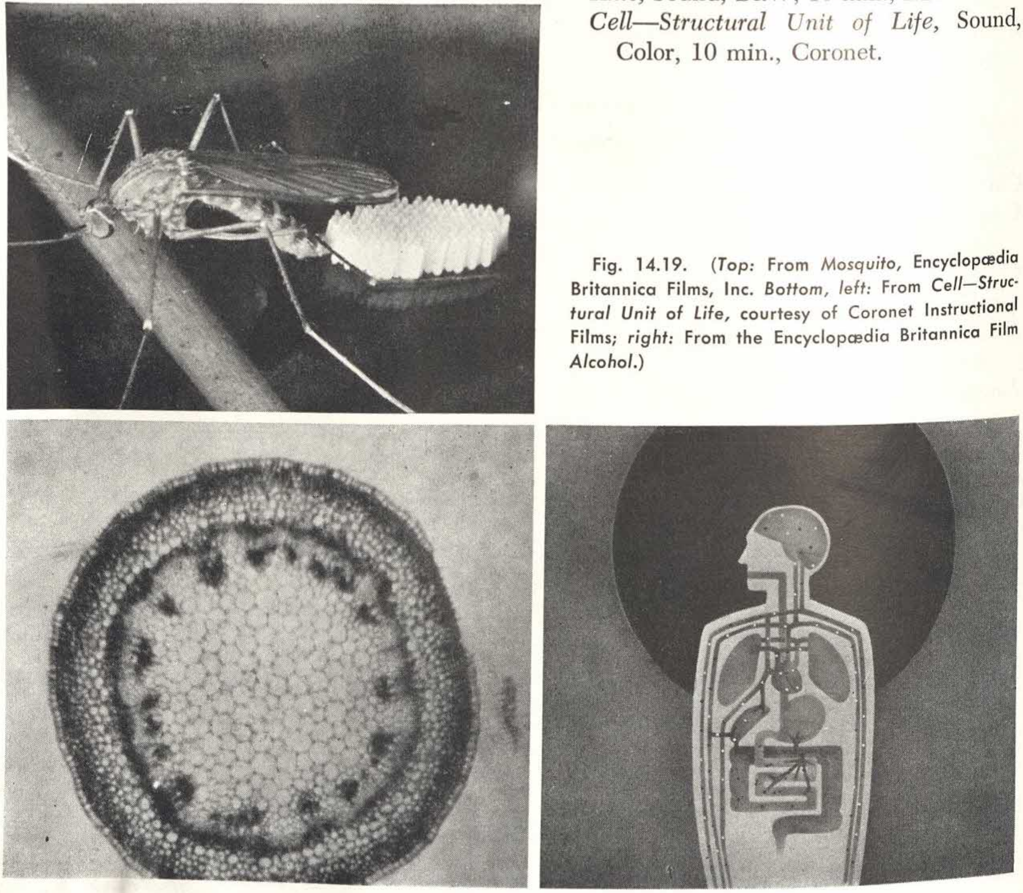


Fig. 14.19. (*Top:* From *Mosquito,* Encyclopædia Britannica Films, Inc. *Bottom, left:* From *Cell—Structural Unit of Life,* courtesy of Coronet Instructional Films; *right:* From the Encyclopædia Britannica Film *Alcohol.*)

Characteristics of Gases, Sound, B&W, 10 min., Films, Inc.
Characteristics of Solids, Sound, B&W, 10 min., Films, Inc.
Frog, Sound, B&W, 11 min., EBF.
Gift of Green, Sound, Color, 10 min., Sugar Information, Inc.
Glacier Park Studies, Sound, Color, 22 min., Simmel-Meservey.
Heart and Circulation, Sound, B&W, 11 min., EBF.
House Fly, Sound, B&W, 11 min., EBF.
How We Get Our Power, Sound, B&W, 11 min., YA.
Mechanics of Liquids, Sound, B&W, 10 min., Coronet.
Mosquito, Sound, B&W, 10 min., EBF.
Nature of Color, Sound, Color, 10 min., Coronet.
Safety in the Chemistry Laboratory, Sound, B&W, 15 min., Indiana Univ.
Solar Family, Sound, B&W, 10 min., EBF.
Sound Waves and Their Sources, Sound, B&W, 10 min., EBF.
Transfer of Heat, Sound, B&W, 10 min., YA.
Work of Kidneys, Sound, B&W, 11 min., EBF.

Social Studies (Fig. 14.20)

Boundary Lines, Sound, Color, 11 min., International Film Foundation.
Brotherhood of Man, Sound, Color, 10 min., Brandon.
Day in Congress, Sound, B&W, 20 min., Instructional.
Democracy, Sound, B&W, 10 min., EBF.
Despotism, Sound, B&W, 10 min., EBF.

Fig. 14.20. (*Left:* From *Driven Westward,* adapted from *Brigham Young,* Twentieth Century-Fox. *Right:* From *Nomads of the Jungle,* courtesy of United World Films, Inc.)

Caravans of Trade: Story of Transportation, Sound, B&W, 20 min., Instructional.
Christopher Columbus, Story of, Sound, B&W, 16 min., EBF.
City (The), Sound, B&W, 32 min., World.
Driven Westward, Sound, B&W, 31 min., TFC.
Federal Reserve System, Sound, B&W, 22 min., EBF.
Franklin, Benjamin, Sound, B&W, 16 min., EBF.
Fremont, John, Sound, B&W, 16 min., EBF.

Jefferson, Thomas, Sound, B&W, 16 min., EBF.

Johnson and Reconstruction, Sound, B&W, 37 min., TFC.

Land of Liberty, Sound, B&W, 80 min., TFC.

La Salle, Robert Cavelier, Sieur de, Sound, B&W, 16 min., EBF.

Meaning of the Industrial Revolution, Sound, B&W, 10 min., Coronet.

Nomads of the Jungle, Sound, B&W, 21 min., United World.

Our Bill of Rights, Sound, B&W, 21 min., Academic.

Our Government, Sound, B&W, 11 min., KB.

Picture in Your Mind, Sound, Color, 18 min., International Film Bureau.

Productivity—Key to Plenty, Sound, B&W, 20 min., EBF.

Roosevelt Story, Sound, B&W, 80 min., Brandon.

Round Trip, Sound, B&W, 20 min., 20th Century Fund.

Tuesday in November, Sound, B&W, 18 min., OWI—Castle.

United States, Sound, B&W, 30 min., BIS.

Valley of the Tennessee, Sound, B&W, 29 min., OWI—Castle.

You Can Beat the A-Bomb, Sound, B&W, 20 min., McGraw-Hill.

SPEECH (Fig. 14.21)

Ear and Hearing, Sound, B&W, 10 min., EBF.

Fig. 14.21. (From *Speech: Function of Gestures,* courtesy of Young America Films, Inc.)

Fundamentals of Acoustics, Sound, B&W, 11 min., EBF.

Human Larynx and Vocal Cord, Silent, B&W, 20 min., Bell Telephone.

Human Throat, Sound, B&W, 10 min., Bray.

Improve Your Pronunciation, Sound, B&W, 10 min., Coronet.

Julius Caesar, Sound, B&W, 19 min., Eastin.

Mechanisms of Breathing, Sound, B&W, 10 min., EBF.

Movements of the Tongue in Speech, Sound, Color, 15 min., International Film Bureau.

Othello, Sound, B&W, 44 min., Eastin.

Parliamentary Procedures in Action, Sound, B&W, 14 min., Coronet.

Radio Broadcasting Today, Sound, B&W, 19 min., MOT.

Romeo and Juliet, Sound, B&W, 44 min., TFC.

Showtime, Sound, B&W, 22 min., Univ. of Wis. Bur. Vis. Instr.

Speech: Function of Gestures, Sound, B&W, 10 min., YA.

Speech: Platform Posture and Appearance, Sound, B&W, 10 min., YA.

Speech: Stage Fright and What to Do About It, Sound, B&W, 9 min., YA.

Speech: Using Your Voice, Sound, B&W, 10 min., YA.

Your Ears, Sound, B&W, 10 min., YA.

Your Voice, Sound B&W, 10 min., EBF.

SUPPLEMENTARY TEACHING FILMS

The 16 mm. teaching film is such an effective medium of communication that industrial groups, government agencies, and other special groups with a message are producers of motion-picture films.

Many of the films produced by these various agencies are offered to schools, for almost any film may be considered "educational" to some extent. The extent to which supplementary films are useful for classroom purposes varies. In order to help you distinguish the sponsored films which make a contribution to teaching from those that do not, the main sources and types of supplementary teaching films will be described.

As was said earlier, most of these films can be classified as documentary, sponsored, or entertainment films.

The Documentary Film

John Grierson, Pare Lorentz, and Robert Flaherty were a few of the many men who were associated with a new and very expressive type of motion-picture film after World War I. Just as an artist chooses still life, portraiture, or urban or rural life as his area of interpretation, these skillful motion photographers chose the drama of people and their association with the forces of society and nature as their assignment. They called their medium of expression the documentary film.

John Grierson is still best known for his motion camera impressions of the herring fishermen of England. Through his skill as author, observer, and sensitive cameraman, *Drifters* (Silent, B&W, 60 min., BIS) lifts the little-known life of the fishermen from its commonplace level to one of high drama.

R. H. Watt created an artistic, fast-moving, fascinating, and also truthful story in *Night Mail* (Sound, B&W, 22 min., BIS), which shows the English postal system in operation. It is an account of a night train that carries the mail. For all its truth in reporting, the viewer sits in admiration and awe as the speeding wheels carry the ghostlike train of cars through the darkness. Yet *Night Mail* is actually meant to be nothing more than a routine mail run.

Robert Flaherty has been recognized for his documentary film stories of primitive men and their struggle to make a home in the harsh environments in which they live. His films on Eskimo life, *Nanook of the North* (Silent, B&W, 90 min., Museum of Modern Art), and on the daily life of the South Sea Islanders, *Moana* (Silent, B&W, 105 min., Museum of Modern Art), are so beautiful and at the same time so factual that sociologists and anthropologists consider them source material.

His last production was *Louisiana Story* (Sound, B&W, 77 min., Standard Oil), which describes the development of the swampland oil fields in Louisiana. The story of the Cajun boy who watches the quietness of his swampland home and hunting ground disrupted by the oncoming derrick barges is gripping, awesome, and moving, as revealed through Flaherty's camera interpretation.

The River (Sound, B&W, 31 min., USDA), which pictures the ravages of the flooding Mississippi River, is one of the most widely used documentary films in the schools today. In this well-known and outstanding example of a documentary film, Pare Lorentz, its maker, has described the medium itself. He uses no sets or professional actors, but records events as they occur in reality.

In *The River* the viewer sees the flood waters causing great damage and loss of life and money. The film then seems to say: "Here is a flooding river. Man's denuding of the upper river valley through careless use of land and forest is largely responsible. Because of this carelessness, the people in the lower river valley communities must suffer." Many implied questions are raised—Can we control floods? Should we reforest? Should contour farming be used?

Although many definitions of the documentary film appear in the literature, one of the best is this statement by Paul Rotha:

> The immediate task of the documentalist is, I believe, to find the means whereby he can employ a mastery of his art of public persuasion to put the people and their problems, their labour and their service, before themselves. His is a job of presenting one half of the populace to the other. Of bringing a deeper and more intelligent social analysis to bear upon the whole cross-section of modern society; exploring its weaknesses, reporting its events, dramatizing its experiences and suggesting a wider and more sympathetic understanding among the prevailing class of society. He does not, I think, seek to draw conclusions but rather to make a statement of the case so that conclusions may be drawn. His world is in the streets, the homes, the factories, and the workshops of the people, presenting this experience and that event to make his

Fig. 14.22. This trapper of the Skeena River area takes his living from the forests. (Courtesy of the National Film Board of Canada.)

point. And if the documentary method today is being put to a double-headed use, if it is being employed to express a meaning within a meaning, then that is not the fault of the documentalist but of the time in which he lives.[8]

The documentary film can be an extremely useful teaching instrument, particularly in the social studies area. Good documentary films can show students how people live, think, and act. The opportunity to do this, to enable a realistic understanding of social problems by the student, is today nearer fulfillment because of these films. Although generally produced for adults, they can bring valuable and heretofore inaccessible learning experiences into the classroom. Since the way to understand these films is to see them, arrange to preview as many of the following as possible:

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[8] Paul Rotha, *Documentary Film*, Faber and Faber, London, 1936, pp. 130–131.

Alexis Trembly Habitant, Sound, Color, 37 min., National Film Board of Canada.
Amazon Awakens, Sound, Color, 45 min., OIAA—Castle.
America the Beautiful, Sound, Color, 20 min., Treasury Department.
Bridge, Sound, B&W, 26 min., OIAA—Castle.
Children Must Learn, Sound, B&W, 14 min., NYU.
City, Sound, B&W, 33 min., World.
Coconut Tree, Sound, B&W, 10 min., Films of the Nations.
Drifters, Silent, B&W, 60 min., BIS.
Face of Youth, Sound, B&W, 28 min., Univ. of Wis. Bur. Vis. Instr.
Great Lakes, Sound, Color, 22 min., National Film Board of Canada.
Hometown U.S.A., Sound, Color, 22 min., Look.
Lobster Town, Sound, B&W, 20 min., Instructional.
Louisiana Story, Sound, B&W, 77 min., Standard Oil.
Moana, Silent, B&W, 105 min., Museum of Modern Art.
Nanook of the North, Silent, B&W, 90 min., Museum of Modern Art.
Night Mail, Sound, B&W, 22 min., BIS.
Passport to Nowhere, Sound, B&W, 20 min., RKO Radio.
Portage, Sound, Color, 22 min., National Film Board of Canada.
Quiet One (The), Sound, B&W, 66 min., Athena Films.
River, Sound, B&W, 33 min., USDA.
Skeena River Trapline, Sound, Color, 16 min., National Film Board of Canada.
T.V.A., Sound, B&W, 20 min., TVA.
Tuesday in November, Sound, B&W, 18 min., Castle.
United States, Sound, B&W, 30 min., BIS.
Valley of the Tennessee, Sound, B&W, 29 min., Castle.
Valleytown, Sound, B&W, 24 min., NYU.

The Sponsored Film

Manufacturers, merchandisers, and distributors have been quick to detect the effectiveness of 16 mm. sound motion-picture films as a means of communication.

Literally hundreds of films are sponsored and produced each year by commercial firms for the purpose of telling the story of the manufacture and use of their product. Since the sponsored film is usually part of a broad advertising or informational program, it is generally organized so as to carry its message to the widest possible audience. Because the schools are sought as part of this audience and because more and more sponsored films are being produced each year, it is the responsibility of school people to understand this type of film, to accept the films which contribute to classroom learning, and to reject those which are of doubtful or no value.

Some educators feel that sponsored films are entirely acceptable in helping to meet the educational objectives of local school systems. Others refuse to use them on the ground that the school could become a captive audience for films which are biased in favor of a sponsor's point of view.

Since every film should be chosen in relation to the school curriculum, it is necessary to examine the sponsored film in terms of the present-day philosophy of the school curriculum.

There seems to be growing insistence on the part of curriculum workers and qualified teachers that community resources must be used more and more. There is also growing insistence that the selection and use of films in the classroom should depend on an analysis of the instructional needs.

If this is true, and if the school wishes to investigate life, those best able to explain the community are the people who make up the community itself. Who is in a better position to explain telephone communication than the telephone company? Who is better qualified to describe the services of an international airline system than an airline company? Who is better qualified to describe how flax is grown by hand, harvested, and converted into linen than the Irish Linen Guild of the British Isles?

Of the many arguments against the use of sponsored films in the classroom, the foremost concerns the fact that the children will be easily impressed and influenced by a biased film presented in a situation in which they are used to accepting information as truthful and beyond question. If a sponsored film is biased or contains unwanted advertising propaganda, there is little doubt that the children will be influenced.

The responsibility here rests with the teacher. If a sponsored film contains information which can help create a desired learning situation, it should be considered for use. If not, it should be rejected. Many sponsored films produced today tell their story simply and effectively and avoid the flagrant advertising which ten years ago was characteristic of such films.

Some school people think that once they have ascertained the need for films in instruction, it is their responsibility to search existing films and discover those that will help accomplish their goals. Sponsored films may be selected if they represent sound, straightforward, authentic explanations of subject content in geography, science, vocational arts, home economics, etc. But if such a film includes unwanted or irrelevant information in such quantities as to make its use undesirable, the film should not be used.

To understand sponsored films, you must preview them. As you see the following films, estimate their usefulness in terms of the points just enumerated:

ABC of Hand Tools, Sound, B&W, 33 min., General Motors.
Adventures in Telezonia, Sound, Color, 20 min., Bell Telephone.
Alaska's Silver Millions, Sound, B&W, 28 min., American Can.
Building of a Tire, Sound, Color, 28 min., Firestone.
Gift of Green, Sound, Color, 18 min., Sugar Information, Inc.
Jet Propulsion, Sound, Color, 15 min., GE.
New York Calling, Sound, Color, 22 min., N.Y. Central.
Rehearsal, Sound, B&W, 23 min., Bell Telephone.
Sightseeing at Home, Sound, B&W, 18 min., GE.
Story of F.M., Sound, Color, 20 min., GE.
Story of Menstruation, Sound, Color, 9 min., International Cellucotton.
Thundering Waters, Sound, Color, 20 min., N.Y. Central.
Wings to Hawaii, Sound, Color, 33 min., Pan-American World Airways.
Wings to Ireland, Sound, Color, 25 min., Pan-American World Airways.

The Entertainment Film

Because all of us are members of the "entertainment film generation," little time will be taken to describe a film form as well known as that produced by the Hollywood motion-picture industry. The films vary between the one extreme of the "western," "murder mystery," "psychological drama," and "thrill-escape" films and the other extreme of such prestige films as *David Copperfield, Romeo and Juliet,* and *Henry VIII.*

Because the entertainment film is such a prevailing medium of communication, its intelligent evaluation and appreciation have become a standard work unit in many high-school English courses.

Because these films deal with anything and everything, it is not at all unusual for teachers to comment, after viewing them, "I wish I could show part of the *Story of Dr. Jenner* to my health class," or "If only I could have all my U.S. history students see *The Oxbow Incident,"* or "If all my students could see *Henry VIII*, I think they'd be more interested in reading Shakespeare." How many English teachers have wished that they could preface the reading of a novel with the film version! How often have social studies teachers had the same idea with respect to their field!

An association called Teaching Film Custodians (TFC) has undertaken to assist such professional education groups as the National Council of Teachers of English, the National Council for the Social Studies, and the Music Educators National Conference in systematically reviewing Hollywood productions for the purpose of shortening, excerpting, and otherwise reëditing selected titles in a form suitable for school use. These edited TFC excerpts are widely used in schools today. You should see those in the following list,[9] and judge their usefulness in terms of known subject-matter objectives.

SOCIAL STUDIES

Due Process of Law Denied, Sound, B&W, 29 min.
Give Me Liberty, Sound, Color, 21 min.
Johnson and Reconstruction, Sound, B&W, 33 min.
Justice Under Law, Sound, B&W, 30 min.

ENGLISH AND LITERATURE

Adventures of Huckleberry Finn, Sound, B&W, 38 min.
Christmas Carol, Sound, B&W, 37 min.
David Copperfield, The Boy, Sound, B&W, 42 min.
David Copperfield, The Man, Sound, B&W, 45 min.
Tale of Two Cities, Sound, B&W, 40 min.
Treasure Island, Sound, B&W, 38 min.

MUSIC

Great Waltz, Sound, B&W, 20 min.
Inside Opera with Grace Moore, Sound, B&W, 28 min.
Naughty Marietta, Sound, B&W, 34 min.
Schumann Story, Sound, B&W, 30 min.

HEALTH AND PHYSIOLOGY

Man's Greatest Friend, Sound, B&W, 10 min.
One Against the World, Sound, B&W, 11 min.
Story of Dr. Jenner, Sound, B&W, 10 min.

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[9] Teaching Film Custodians, Inc., *Films for Classroom Use*, New York, 1950.

Story of Louis Pasteur, Sound, B&W, 34 min.
They Live Again, Sound, B&W, 11 min.
Triumph Without Drums, Sound, B&W, 10 min.

VALUE OF 16 MM. SOUND FILMS

Ask the children who see films during their classes what they think of them, and there will be many responses.

Films can affect the whole climate of instruction. Careful selection and use of teaching films can result in positive changes in pupils' interest, learning efficiency, retention of learning, and reading performance; furthermore, films offer a natural path to learning.

INCREASED PUPIL INTEREST

A research study by Wittich and Fowlkes[10] reports reactions of school children to the use of films. Members of the intermediate grades were allowed to see carefully selected teaching films in science and the social studies. At first some of the children were not much interested in the use of films in work-study situations, but by the end of the school year the following changes in interest and attitude occurred:

> Sound movies made it easier for me to understand about things. They don't use such big words as the geography book does.
>
> Seeing the films gave me new and different ideas.
>
> I learned from the films how countries really look, how people look. I got a better idea of what part of the world the country was at.
>
> I never knew how some of the people lived when I read in books and I didn't know what kind of clothes they wore or how they looked.
>
> It's fun and interesting because it tells what books don't tell. It makes it more plain to me. I can really see things.[11]

In response to the question, "Do you like this way of learning?" such responses as the following were made by these students. Note the variations shown in these responses.

> Case 1—I.Q. 135; reading score 9.6.
>
> I liked the sound films because they are a new way of learning, and a movie gives more information than just reading. . . .[12]

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[10] Wittich and Fowlkes, *op. cit.*

[11] *Ibid.*, pp. 78, 79.

[12] *Ibid.*, p. 88.

> Case 12—I.Q. 114; reading score 7.6.
>
> I like the sound films because I get more out of what I can really see. . . .[13]
>
> Case 18—I.Q. 105; reading score 8.2.
>
> This way of learning shows the way things are done. It's easier to understand the subject. . . .[14]
>
> Case 28—I.Q. 95; reading score 5.9.
>
> I like this way of learning because I get information that I would not be able to find in books. . . .[15]
>
> Case 30—I.Q. 85; reading score 5.7.
>
> I like this way of learning because I can see all the details. . . . In books there are only words and I can't see much of a background. In films I can hear the people.[16]

The fact that these pupils so consistently mention the clarity and understandability of films as learning devices leads to the observation that pupil interest is enhanced because the sound film is a realistic way of learning, like that used in out-of-school situations. We are conscious of our everyday environment because we observe it through sight, sound, and mind. A good teaching film is interesting because it presents information in a realistic manner. It is natural to learn by seeing and hearing.

INCREASED FACTUAL LEARNING

Studies by Freeman, Knowlton, Tilton, Wise, and Wood all give evidence to the effect that when carefully selected silent films are used with regular classroom study materials, advantages in learning occur that are above and beyond what can be accomplished with more traditional instruction materials.

Wood and Freeman set out to discover the effect of a series of silent films in fourth-, fifth-, and sixth-grade geography and in junior-high-school general science. Eleven thousand pupils participated. The investigators reported as follows:

> If we examine the average gains made by the entire group of children in all cities on all topics taken together, we find that the X group excelled the C group by a substantial and significant margin. . . . In the case of the Geography series, the gains of the X group exceeded the gains of the C group by 33 per cent of the standard deviation of all the scores. In the topics on General

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[13] *Ibid.*, p. 90.

[14] *Ibid.*, p. 92.

[15] *Ibid.*, p. 94.

[16] *Ibid.*, p. 94.

Science the gains of the X group exceeded those of the C group by 15 per cent of the standard deviation. Stated in another way, it appears that in Geography the superiority of the X group in gains is about 17 per cent of the mean gain of both groups, and in General Science the X superiority is about 11 per cent of the mean gain of both groups. Or stated in still another way, it appears that in Geography 72 per cent of the X group gained more than the average gain of the C group, and that only 29 per cent of the C group gained as much as, or more than, the average gain of the X group; and in General Science 60 per cent of the X group gained more than the average gain of the C group, and only 38 per cent of the C group gained as much as, or more than, the average gain of the X group. These are substantial and reliable differences.[17]

Wise reports the following results when the silent motion-picture films *The Yale Chronicles of America* were used with nearly 1000 children in 28 American history classes in midwestern communities:

> The motion picture is an instructional tool of tremendous power in the accumulation of knowledge and ideas and in the development of attitudes and appreciations. Because of its peculiar nature, that is, the unique quality of motion which it possesses, it contributes something to learning which is otherwise unobtainable.[18]

Two earlier investigators seeking to measure the effects of these same films reported as follows:

> The experimental group gain exceeded the control group by 19 per cent.[19]
>
> The photoplays were most effective in teaching a knowledge of interrelationships involving the interaction of events and of forces. They increased the pupils' learning of this sort 35 per cent, or about as much as they increased the gaining of all kinds of historic knowledge.
>
> The next largest contribution was to the teaching of historical personages. The increase of learning of this sort attributable to the photoplays was 23 per cent.
>
> The contribution to the teaching of historical geography was 19 per cent.[20]

After the advent of the sound film into the classroom in 1930, research was undertaken to discover if this new communication device was as successful as its predecessor, the silent film. The chart in Fig. 14.23 answers this question in the affirmative.

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[17] Ben D. Wood and Frank N. Freeman, *Motion Pictures in the Classroom,* Houghton Mifflin, Boston, 1929, pp. 214–215.

[18] Harry A. Wise, *Motion Pictures as an Aid in Teaching American History,* Yale University Press, New Haven, 1939, p. 142.

[19] Daniel C. Knowlton and J. Warren Tilton, *Motion Pictures in History Teaching,* Yale University Press, New Haven, 1929, p. 87.

[20] *Ibid.,* p. 90.

Rulon describes the results obtained from using several selected sound films with ninth-grade general science students: "In terms of immediate student achievement, our results indicated that the teaching technique employing the motion-picture film was 20.5 per cent more effective from the instructional standpoint than was the usual unaided presentation."[21]

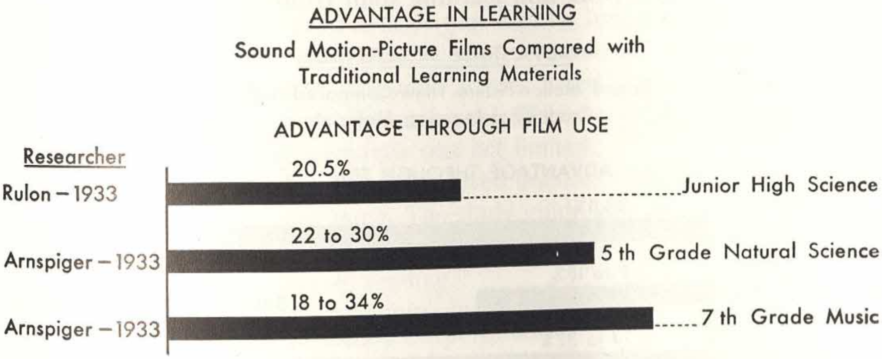

Fig. 14.23.

Arnspiger sought to measure the effects of using sound films among almost 2400 fifth- and seventh-graders in schools in five eastern cities. The results showed that their use made distinct contributions to learning: "The per cents of superiority ranged from 22 to 30 in the natural science units and from 18 to 34 in the music units."[22] Other researches conducted during these same years by Consitt, McClusky, and Weber, among others, showed similar supporting data.[23]

There is adequate research evidence to support the fact that when carefully selected teaching films are added to the classroom array of learning materials, positive contributions are made in the form of more effective learning of pertinent factual information.

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[21] Phillip J. Rulon, *The Sound Motion Picture in Science Teaching*, Harvard University Press, Cambridge, 1933, p. 98.

[22] Varney C. Arnspiger, *Measuring the Effectiveness of Sound Pictures as Teaching Aids*, Teachers College, Columbia University, New York, 1933, p. 83.

[23] Francis Consitt, *The Value of Films in History Teaching*, G. Bell & Sons, London, 1931; Frederick K. McClusky, *An Experimental Comparison of Different Methods of Visual Instruction*, doctoral dissertation, University of Chicago, 1922; J. J. Weber, *Comparative Effectiveness of Some Visual Aids in Seventh-Grade Instruction*, Educational Screen, Chicago, 1922.

RETENTION OF LEARNING

Research studies which measure the permanence of information learned from films consistently show that films are superior to verbal materials when retention is measured by delayed or duplicate form tests.

Knowlton and Tilton administered delayed tests at intervals of from three to seven months after the film lessons were completed. They found that films influenced retention as follows: About 12 percent more information was retained from film learning than from verbal, and retention of historical geography was 14 percent greater from films.[24] The relationship between retention and sound films is shown in Fig. 14.24.

ADVANTAGE IN RETENTION

Sound Motion-Picture Films Compared with Traditional Learning Materials

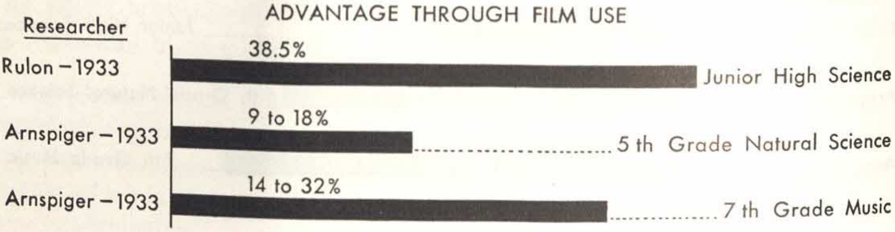

Fig. 14.24.

Thus research indicates that when children learn through teaching films, definite advantages in terms of retention of factual information occur.

INCREASED READING INTEREST

The relationship of films to reading interest and skills has been one of the points most argued by those who support and those who attack the growing use of films in the classroom.

Some people believe firmly in the inviolability of reading as a source of information and hence maintain that the increasing use of films in instruction will adversely affect interest and skill in reading. This concern is unwarranted.

Wood and Freeman sought teacher reactions regarding the effect of films on interest in reading. They report:

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[24] Knowlton and Tilton, *op. cit.*, p. 91.

> Three fourths of the teachers [93 participated in the experiment] believe that the films increase the quantity and quality of the children's reading. This opinion is confirmed by the report of the school librarians. In several cities administrative officers of the schools said that school librarians have reported that library facilities were not adequate to care for the increased library demands of the children involved in this experiment.[25]

The teachers' own responses further confirm this reaction:

> The children will now read articles they find on Irrigation, Coal and other topics which they would never have attempted to read before seeing the films. They notice newspaper and magazine articles based on these subjects more than they would have without these pictures. They would probably read more, if their supply of reading materials was not limited.
>
> The quality of reading has been improved because the child has an intense desire to find out a definite thing. The study guide was an aid in organizing and judging the information found on the topic. The many contacts the picture gave increased the quantity of reading.[26]

In perhaps the most ambitious experimental work done on the role of films in teaching history, Francis Consitt summarizes several individual experiments as follows: "It [the film in teaching history] arouses interest that stimulates the children to further mental effort; this is shown in their readiness to ask questions, *in desire for books. . . .*"[27]

Knowlton and Tilton report that seeing the films caused the children "to read voluntarily more supplementary history material under controlled classroom conditions:

"(a) 40 per cent more reading was done;

"(b) a larger percentage of the group chose to read;

"(c) the average amount, for those reading, was larger."[28]

An attempt was made later to check this information.[29] The school librarian was asked to devise a means of checking the reading done voluntarily by the intermediate-grade pupils of a large urban elementary school, and in 1946 a system of recording book withdrawals was instituted which enabled the reading habits of over 300 children to be studied. The children who regularly saw films in their classes did over 50 per cent more voluntary reading, as evidenced by book withdrawals, than the group with whom no films were used.

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[25] Wood and Freeman, *op. cit.*, pp. 153–154.

[26] *Ibid.*, p. 154.

[27] Consitt, *op. cit.*, p. 378.

[28] Knowlton and Tilton, *op. cit.*, p. 93.

[29] Walter Arno Wittich, "Effects of Film Use in Reading Habits," unpublished study, 1946.

Research evidence establishes the fact that the regular use of teaching films produces in pupils the desire, interest, and readiness both for more and for more comprehensible reading.

A NATURAL PATH TO LEARNING

Whereas traditional materials of instruction are usually interpreted by a single sensory receptor, the eye or the ear, the sound motion-picture film calls for joint sensory reception.

When a pupil reads a book, he responds to a series of visual stimuli. When he listens to the radio or to recordings, he responds to a series of auditory stimuli. In the case of a sound film, he sees and hears simultaneously; both the eye and the ear are focused on the stimuli. The sight-and-sound way of learning closely resembles the way the child naturally becomes aware of his surroundings as he goes to school, plays games, and participates in home and family activities.

Because the teaching film attracts the attention of both ears and eyes and so closely approximates natural learning conditions and stimuli, it produces heightened interest and understanding in the learner. It is natural for children to be interested in a communication medium that challenges their attention simultaneously, both visual and auditory.

SELECTION OF FILMS

The teacher of almost any subject and grade has available numerous sound motion-picture films. Each week sees the production of new ones for school use. Today two of the leading producers of teaching films (Encyclopædia Britannica Films, Inc., and Coronet) release new ones at the amazing rate of one or more each week. From this large supply the teacher is asked to select the few that will improve the learning opportunities of the class.

The producer of a teaching film usually studies carefully the sales possibilities of a proposed film; he may also study the teaching problems. If he believes the film can assist in improving the learning situation, he will invest the time, effort, and money required for its production. This in itself is one important phase of film selection. In the past many poor films were produced, only to lead the producers into bankruptcy. Today the trend is toward the production of more effective teaching films.

A second circumstance that assists the teacher in selecting films is the fact that most distributors of these films ask teachers to try them out in their classrooms before they are purchased. In this way valuable information can be gathered about the effectiveness of the films. In some cases teachers' comments are incorporated in the catalogue description of the film.[30] Film catalogues are now being prepared in which the films listed have descriptive reports written by teachers for teachers.

This was the procedure followed by a state-wide committee of teachers who viewed numerous films in their own classrooms and reported their own and their pupils' reactions. The composite reactions of fifty-six teachers were then recorded and made available to every teacher in the state.[31]

Beyond such assistance as the above, the responsibility for the selection of films rests with the teacher. Before selecting a film he should have definite reasons for using one. If his students have shown readiness for learning about the culture of people in North Africa, the teacher will assemble suitable learning materials. These may include such traditional materials as books, maps, a globe, bulletin board pictures, models, and specimens. His knowledge of what a film can contribute may lead him to search for film-presented information; but he must consider the pupils' interests, maturity levels, and reading difficulties when selecting *the* film which can make a real contribution to his class.

CONSIDERATIONS FOR SELECTION

Two considerations are basic to film selection: (1) Does the film make a contribution? Is the film a source of information beyond that available from materials already in use or available for use? (2) Is the film of a high quality? These two considerations will be expanded and illustrated.

The Contribution Made by the Film

1. *A useful teaching film contains authoritative information.*

In years past it was not at all uncommon to find gross errors in films for classroom use. Now, however, film production includes painstaking study and authentication of content.

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[30] See Bureau of Visual Instruction, *Educational Motion Pictures*, University of Wisconsin, Madison.

[31] State Department of Public Instruction, *Audio-Visual Materials for the Wisconsin Social Studies Program*, Bulletin No. 14, Madison.

A film that explains undersea life in terms which scare, overdramatize, and go beyond the truth should not be used with a class in natural science.

Today most teaching films carry the name of a well-known and respected authority on the subject treated by the particular film. The name of an authority on the title page of a textbook bears much the same relationship to the content of the book as does the name of a collaborator to the content of a film.

2. *A useful teaching film is keyed to a definite age group.*

Many useful and well-produced films may include information on the same general subject, but it is presented in such a way as to be interesting and completely understandable to a specific age group, such as primary or junior-high-school children, or adults.

One film about Palestine may describe children's activities and home relationships; it is organized in such a way that children will be interested and able to understand it. Another film about Palestine may explain current political problems confronting its government; this film is beyond the children.

One film about polar bears describes their antics and habits in terms understandable by small children. Another film on the same subject painstakingly describes the genus *Thalarctus maritimus* (polar bears). It will be most interesting and understandable to college zoology students.

The teacher must search for and select the film that will challenge the age group with which it will be used. The speed with which the film moves from scene to scene, the pace of the dialogue or narration on the sound track, the age level of the content—all must be evaluated in terms of the learners who will use the film.

3. *A useful teaching film must contribute to the group learning situation.*

After seeing a film on triangles, a geometry teacher commented, "That's a very well-organized chalkboard demonstration in film form." Then he added, "But *I* can do the same thing."

The logical question here is, Is that film a teaching film? A teacher's initial reaction is that if the film has a teaching function, it is a useful film. While this "triangle" film may have been used to show student teachers how a chalkboard demonstration is conducted, it actually does nothing for a geometry class that a good instructor cannot do.

A film on social behavior methodically records the dialogue used when making introductions. Practically the same dialogue will be found in any modern English textbook in use in a junior high school. If the textbook version accomplishes as much as the film version, the film has no outstanding contribution to make.

In contrast there are films which bring remote people and places into the social studies classroom. Others show demonstrations involving equipment seldom found in classrooms. Still others present interesting, graphic, and authentic records of events that occur once in a lifetime. Films of this type present experiences which are available through no other medium. Such films are extremely valuable in making possible complete understanding of a given learning problem.

4. *A useful teaching film is keyed to the curriculum problem or unit of study.*

Film libraries contain a host of films which are authentic, interesting, full of information, and understandable by school children. It is the teacher's task to select the few which will give the students more complete understanding of the unit of work with which they are concerned.

A film which compares two forms of government with the obvious purpose of "proving" the superiority of one form over the other is not the kind of teaching material for a Problems of Democracy class, but it might well be used to study propaganda methods.

The question is no longer, Is it interesting? but rather, Does it present authentic information which is needed in the current learning problem? In short, does it help in what the school of today is attempting to accomplish in classroom work and experience?

The Quality of the Film

Just as the teacher, in selecting a textbook or supplementary reader, pays attention to size of type, quality of paper, binding, illustrations, and general attractiveness of format, so the teacher who is selecting films must give attention to similar characteristics in the teaching film—quality of the photography, quality of the sound, general organization of content, and the presence or absence of teaching aids.

1. *A useful teaching film is well photographed.*

It is essential that instructional films be photographed as vividly and carefully as possible. The film must be well lighted rather than too dark. The viewer must be able to see a well-defined projected image. The camera must be in focus so as to produce a sharp, distinct image on the screen. The photography must vary with the type of material, so that a subject will remain on the screen longer when time is needed to understand it, and shorter when only an impression is required.

The film is presented in color if color will increase the viewer's understanding. Many subjects—animals, mechanisms, objects in nature—are identified through color. When color is used it should be as close to the real color as possible. Color photography which is heavily overcast with bluish or greenish hues is not desirable because it does not portray true natural colors. Poor color is often worse than no color at all.

2. *The useful teaching film can be heard distinctly.*

Learning advantages are greatest when the viewer can see and hear what he is investigating. When sounds help identify an object or process, a clear, lifelike sound track is essential.

The film whose sound track has muffled or entirely inaudible low notes, or distorted, thin high notes, misses the opportunity to appear realistic to the viewer. Today it is possible to produce clear, natural, and easily heard sound films. The good teaching film is heard so distinctly that the listener becomes engrossed in the visualized experience and pays no attention to the quality of the sound *per se.*

3. *The useful teaching film is well organized.*

By the organization of a sound film is meant the smooth flowing together of photographed scenes and the accompanying sound. The viewer is not conscious of this quality in a well-organized film because the narration or explanation moves along from scene to scene with scarcely recognizable shifts.

In such a film, mechanical devices such as fades (the slow disappearance of one scene before the following one appears), quick cuts (abrupt shifts from one scene to another), dissolves (the merging of the end of one scene into the beginning of the next), and many others are all skillfully used in punctuating and giving meaning to it.

A film which is jerky, meanders, or has confusing sequences interferes with the audio-visual experience it attempts to create.

4. *The useful teaching film is usually accompanied by teaching aids.*

These may take the form of study manuals or study suggestions concerning its effective use in one or more learning situations.

SELECTION THROUGH PREVIEW

The most effective way to select films is to preview them. If possible this should be done in class so that the reactions of the students may be noted. However, sound film equipment should be accessible to every teacher so that he may preview whenever films are available and during odd moments. *There is no substitute for preview.*

Unlike books, which can be quickly skimmed over if there is no time for more leisurely examination, a teaching film must be seen—if not in its entirety, at least as long as is required to discover whether it is of such potential value that the teacher should see all of it. A sound film takes 10 minutes for each 400-foot reel, and there is no satisfactory way of speeding it up.

Methodical previewing leads naturally to record keeping. It was suggested above that the films mentioned earlier in this chapter be previewed. In doing this, the teacher should keep in mind the points just discussed. Keeping methodical preview records over a long period of time will enable the teacher to know about useful films in his particular subject area. The following record form is suggested:

FILM SELECTION GUIDE

Title of film .... Previewed by ....
 Rental source and charge ....
 Purchase source and charge ....
 Produced by .... Subject collaborator ....
Use data
1. Is the film authentic? .... Comment: ....
2. Useful in grades ....
3. Are experiences contributed which are beyond what can be accomplished
 with traditional materials now used? ....
 List outstanding contributions ....
 ....
 ....
 ....
4. Curriculum or unit of study use suggestions: ....
 ....
 ....

Format
1. Photography: excellent, good, poor. Comment: ....
2. Sound: excellent, good, poor. Comment: ....
3. Organization of content: excellent, good, poor. Comment: ....
4. Accompanying study materials include: ....
Brief description of film content: ....
....
General film rating: excellent, good, poor: ....
Recommend for future use: Yes .... No .... Reason ....

EFFECTIVE USE OF THE TEACHING FILM

There are many ways of using a film in the classroom. We shall examine several possibilities. The following represents one level of film use:

> TEACHER. This morning we are going to begin the study of simple machines. We will begin our study by seeing a film. It's a good film. Now keep your eyes and ears open and we'll all learn a lot! Lights out!

A second teacher who uses the same film is able to help her pupils acquire almost double the information from seeing and hearing that film.

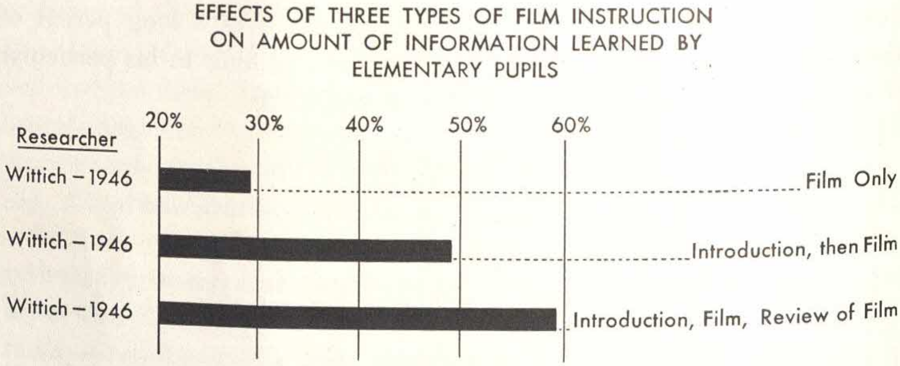
EFFECTS OF THREE TYPES OF FILM INSTRUCTION ON AMOUNT OF INFORMATION LEARNED BY ELEMENTARY PUPILS

Fig. 14.25.

The difference between what each group learns from the film represents the difference between each teacher's plan for using it.

The teacher's role in film utilization is summarized in Fig. 14.25.[32] The upper bar indicates the level of achievement gained when elementary-school pupils (fourth, fifth, and sixth grades) viewed a film without any organized preparation. The class had been prepared for seeing this film only in the course of casual and unorganized classroom work. After seeing the film, the pupils answered test questions.[33]

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[32] Prepared from data presented in Walter Arno Wittich and John Guy Fowlkes, *Audio-Visual Paths to Learning*, Harper, New York, 1946.

The middle bar indicates the level of achievement attained when these pupils viewed a film after being definitely prepared. The class was asked, prior to seeing the film:

1. To read a brief story-like description that conveyed a general impression or mood.
2. To study difficult words and phrases in the sound track.
3. To anticipate further the content of the film by studying questions which led toward large areas of information presented in the film.
4. To view the film after the above three steps were completed.
5. To take a test immediately after seeing the film.[34]

The third bar indicates the level of achievement attained when these pupils viewed a film after definite preparation and were given follow-up activities. In addition to the above five steps, the class was asked to do the following things twenty-four hours later:

1. To answer a prearranged series of discussion questions.
2. To see the film a second time.
3. Immediately afterward, to take the test a second time.[35]

The chart shows that careful planning can nearly double the effectiveness of a teaching film in terms of the information acquired by the pupils who see it.

The teaching film is a powerful and useful instructional tool. Its ultimate effectiveness, however, is largely determined by the teacher and the manner in which he uses it. In too many cases the film has been considered a "package" of information. Because it tells a rather complete story or gives a well-developed explanation of a process or phenomenon, many teachers have used it in a way that assumes it to be both "book and teacher."

If the teaching film is used as a supplementary teaching material, a great deal of its potential effectiveness lies in the way it is introduced into the classroom.

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[33] *Ibid.*, p. 29.

[34] *Ibid.*, pp. 29–30.

[35] *Ibid.*, p. 30.

Several teaching responsibilities apply as surely to the effective use of films as to the intelligent use of books, maps, models, charts, and field trips. These responsibilities include interest, vocabulary, planning, classroom conditions, pupil evaluation, and follow-up activities.

1. *Interest the learner in seeing and hearing the film.*

In the absence of interest, little or no learning may take place. Likewise, unless a child wants to see a film, he may learn little from seeing it.

The teacher can awaken interest in many ways. He can talk about the subject to be studied, and ask the children what they know or wish to know about it. For example, the following conversation concerned *Farmers of India* (Sound, B&W, 17 min., United World), a scene from which was part of Fig. 14.12:

TEACHER. What ideas do you have about the farmers of the Ganges River valley of India? (*Pause while the children think.*)

PUPIL. They worship cows and insects.

PUPIL. They have many strange customs.

PUPIL. Too many people live in India—so many that they all don't have enough to eat.

PUPIL. They have queer music—it sounds all "clangy" and "high."

PUPIL. They're not very bright.

TEACHER. Why do you think that, William?

WILLIAM. I'm not exactly sure. I've heard that, though.

TEACHER. William says he *heard* that the Indians were "not very bright." Is that a good way to get information?

CLASS. No.

PUPIL. He should try to find out if what he's heard is right.

TEACHER. How can you find out, William?

WILLIAM. I can read about it—or ask you.

TEACHER. Yes, read books about India. And, since this is going to be your job, I'll expect you to find answers.

PUPIL. We could look at a film about India and the farmers who work there.

TEACHER. Yes. Now let's return to my first idea. What *questions* do you have about the farmers of the Ganges River valley of India?

PUPIL. The people! What are they like?

PUPIL. How do they dress?

PUPIL. The children! Do the children go to school?

TEACHER. I'm glad someone mentioned children.

PUPIL. Do they play games?

PUPIL. I'd like to see their homes. I wonder if they're like ours?

TEACHER. Let's put some of our ideas and questions on the chalkboard.

(*Teacher begins the following lists:*

1. Ideas I have about farmers of India
   a. Strange customs
   b. Poor farmers
   c. Little food, etc.
2. Questions I have about farmers of India
   a. What are houses like?
   b. What are the children like and how do they work and play?
   c. How do they dress? etc.)[36]

By asking a challenging question or two, this teacher has gained the attention and interest of his pupils. Regardless of what they were thinking about when he began, more and more of them are now thinking about the subject to be studied, India and the people who live in the Ganges valley.

This teacher knows that if he can help the learner express his own questions about India, the student will discover real and personal reasons for finding answers to them. As this class discussion continues, more responsibility will be assumed by the children for answering their own questions, for inquiring, for seeking new information. Soon they will be "ready" for the experience of acquiring information from the teaching film itself.

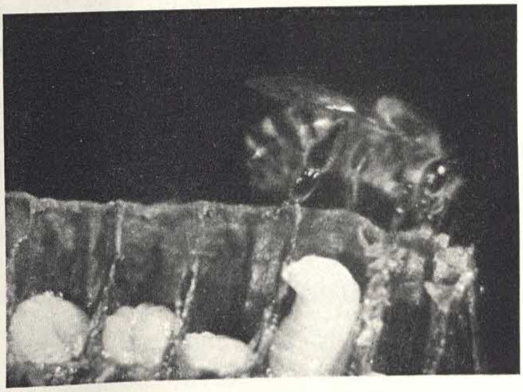

Fig. 14.26. A scene from the film *Honeybee*. (Courtesy of Encyclopædia Britannica Films, Inc.)

The teacher often can contribute interesting facts or anecdotes about the place or object being studied. If you were in the intermediate grades and were preparing to study a film on honeybees, wouldn't you become just a little more curious about that insect if the teacher spoke to you as follows:

> Can you remember hearing a familiar Bzzzzz-Bzzzzzz-zzz near the flower bed or out in the open fields or in the woods? That's the busy signal of a flying sugar factory, wax factory, and harvest combine.
>
> Why all of these? A sugar mill on wings because with lightning swiftness it

---

[36] Excerpt from recorded classroom discussion in which one of the present authors participated.

> gathers nectar from flowers which in its special stomach sac is transformed into honey; a wax factory because from under scales on its abdomen that substance may be secreted, gathered up and built into a nest; a harvester because not only is food collected for its own use, but by carrying pollen from blossom to blossom, many of Man's crops develop to maturity.
>
> And what is this miracle of Nature? The honeybee—the worker honeybee![37]

In anticipating the study of pioneers of the western plains (high-school level) the teacher can tell or read about interesting situations which possibly only he knows about and which cannot be found easily in books or films. A "side light" like the following will give students added reason for finding out both about the people who took advantage of the free lands of the West and what the people and land were like:

> Then came the Homestead Act of 1862 which opened the West, almost for the asking, to those citizens who were brave enough and hardy enough to seek out the land and hold it.
>
> It promised that: "Any citizen of the United States, 21 years or older, who has never been an enemy of the government, is entitled to 80 to 160 acres of land if he agrees to live on it, to farm it, and to improve it for 5 years."
>
> Thus, by living up to the terms of the act and by paying the United States government $18, any citizen could claim a quarter section of land as his own.[38]

There are innumerable ways in which the ingenious teacher can awaken interest in the subject being studied, and specifically in the materials being used. Regardless of the manner he chooses, the responsibility for developing pupil interest must be met.

A teaching film is a supplementary instructional material of known effectiveness. If used in a climate of high pupil interest, that film will be even more effective.

2. *Anticipate vocabulary problems which may interfere with the effectiveness of the teaching film.*

The members of a ninth-grade human biology class had just finished seeing the teaching film, *Digestion of Foods* (Sound, B&W, 10 min., EBF). Discussion of the actual process of digestion revealed that only a few of the pupils completely understood what took place. The teacher was momentarily puzzled, for all the information was given clearly in the film. The following is from the script of the film:

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[37] Visual Learning Guide for *Honeybee*, National Audio-Visual Council, Chicago.

[38] Visual Learning Guide for *Pioneers of the Western Plains*, National Audio-Visual Council, Chicago.

Scene (STOMACH POUCH)

Stomach functions are essentially controlled by chemical and nerve factors

Scene (STOMACH MOTILITY)

working automatically. The digestive movements of the stomach are *peristaltic* in nature and, in the early stages of digestion, sweep across the lower half of the stomach toward the outlet to the *intestines.* When food has been reduced

Scene (THE DUODENUM)

to a semiliquid consistency by the *gastric juice,* it passes into the *duodenum.* Here it is mixed with bile and *pancreatic juice.*

Scene (PANCREAS AND DUCT)

The pancreatic juice is secreted in the pancreas and passes through ducts into the duodenum.

The teacher was quick to realize that while the teaching film is a highly descriptive medium, it cannot be uniformly meaningful to all the pupils because of individual differences in vocabulary mastery and in previous familiarity with human biology.

The sound track uses a vocabulary of "special words" to describe the process of digestion. Some of these words are:

digestive movements
peristaltic
intestines
gastric juice
duodenum
pancreatic juice

We may ask, "Why is it necessary to use such big words?" But although they may be big, they are the language of biology. If we wish to learn about digestion, we have no alternative but to know the meaning of special words used to describe the process.

Teaching the meaning of words which are specific to a given subject area is the individual responsibility of the teacher of that subject. Since every special subject has its own vocabulary, every teacher is a vocabulary teacher, at least to some degree.

Some new words may be explained by the film itself because visual concept and word concept are closely related. Other words should be studied beforehand so that learning will be enhanced rather than retarded when the film is shown.

In a teaching film on India the word "ghat" is used several times in describing the relationship between a ghat and that country's religion. Even though most of the children gained an understanding of the word from the context, some shared the confusion felt by this typical sixth-grade student:

Teacher. How are the ghats used which you saw in the film?
First Pupil. The people walk down them as they go to bathe in the Ganges. The ghats are stairways—
Second Pupil. Stairways! Why "ghats" are guns. Anybody knows that![39]

Needless to say, a vocabulary problem here interfered with complete understanding.

Another case of vocabulary confusion of the same type occurred when a group of intermediate-grade children were attempting to define some words used in a film about China:

Teacher. "Characters." We talk about Chinese characters. What does that mean, Allen?
Allen. It means queer individuals.
Teacher. That is the contemporary meaning, is it not? Well, it is a good thing that we studied that word, a very good thing. What else might it mean, Leonore?
Leonore. Well, it might mean that they use them [characters] to write with.
Teacher. These queer characters, you mean? Instead of letters of the alphabet, what do the Chinese use to write or to read, to make up words?
Edith. They use "signs."
Teacher. They look like signs, don't they? We will see these signs or symbols in the film. These are the things that make up the words, so when they talk about characters, we will know they don't mean queer individuals, won't we? We will mean these "things" that they use instead of the letters of the alphabet. Boys and girls, do you see how important it is to study some of these tricky words before we go into a new learning experience? Do you think it is worth the time? (*Pupils nod agreement.*)[40]

In both these situations words were confused because commonplace, everyday meanings were substituted for specific meanings used in the film.

Frequently a teacher assumes that the vocabulary growing out of general reading or oral communication will be sufficient to allow learners to understand specific teaching films. This is a dangerous assumption.

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[39] Tape-recorded classroom record.

[40] American Association of School Administrators, *Official Report*, 1948, p. 125.

Examine this list of some of the unusual words used in the sound track of the film *Honeybee:*

abdomen
cells
cross-pollination
drove
larva
nectar
pupa
royal jelly
swarm
wax

Unless the sixth-graders who are to study and learn about bees have a reasonable understanding of such specific words as these, they will certainly understand only partially what takes place in the film.

Judge for yourself what will happen if pupils do not fully understand such words as the following before seeing the teaching film *Simple Machines* (Sound, B&W, 10 min., EBF):

force
fulcrum
gear
lever
load
pulley
screw
wedge
windlass
work

We may reasonably ask, Won't the learner acquire the meanings of these words from the film and the word descriptions? Without doubt he will acquire some new meanings. However, the organization of a film usually implies certain levels of ability and knowledge and the film often proceeds at a pace which does not permit the pupil to pause and reflect over the meaning of specific scenes or words.

The need for specific vocabulary study is apparent in almost every area of film utilization. Many pupils are denied all the advantages of learning from films because they are allowed to see the films without proper vocabulary preparation.

Ineffectual vocabulary work with respect to audio-visual materials is sometimes closely related to reading habits:

TEACHER. When you are reading and you bump into a new word that you don't know—now, be very honest with me—what have you sometimes done?

EDITH. Well, sometimes we skip over it.

TEACHER. You skip over it? Do any of the rest of you skip over a hard word? (*All nod.*) All of you? I think all of us would admit that we have done that, many times. But that isn't the way to learn, is it? What should we really do, Rosemary?

ROSEMARY. We should look it up in the dictionary.[41]

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[41] *Ibid.*

Specific vocabulary knowledge is an important factor in determining the effective use of the teaching film. Prestudy of the film vocabulary makes for more effective use of the film in the classroom.

3. *Help the learner plan his search for information before he views the teaching film.*

Often the most effective study plan a pupil can make involves his awareness of questions to which he seeks answers. When the teacher asked, "What questions come to you when you think about the farmers who live in the Ganges valley of India?" the children listed the following:

1. What are the people like?
2. How do they dress?
3. What are their homes like?
4. Do the children go to school?
5. What games do they play?

The children responded with these questions because they actually existed in their own minds. Hence these questions form one part of a study plan which is not only interesting but very important to the children themselves.

For many reasons the teacher will want to add his ideas to the study plan. He may ask additional questions, put emphasis on one or more of those the pupils have suggested, or warn the class not to be disappointed if all their questions are not answered by viewing a single film.

Just as definite assignments of "things to find answers to" have traditionally been part of reading-study planning, so the film-study assignment planned by both teacher and pupils is an effective way of approaching the study of a teaching film.

Insofar as the pupil knows his film-learning responsibility before he sees the film, the experience of seeing it will itself take on additional meaning.

The learner can best approach the viewing of a film if he has in mind known, clear-cut purposes for seeing it. A film-study plan will help him organize his impressions.

A good study plan is largely an expression of the pupils' own search for answers and information. It is not teacher-imposed; rather, it is an outgrowth of pupil-teacher planning.

Here is a pupil-teacher study plan for a senior-high-school course in American history for two films, *Democracy* (Sound, B&W, 10 min., EBF) and *Despotism* (Sound, B&W, 10 min., EBF):

Things we want to find out about while seeing the film:

1. What is Democracy?
2. Are there ways of telling whether or not we're living in a democratic way?
3. What is a despotic society?
4. How can we tell whether or not we are behaving in despotic ways? In democratic ways?
5. What clues does the film give which will help us judge how we really live together in our classrooms, in our homes, and in our community.

The teacher who previewed the film knew that it described democracy not as a *thing* but rather as a climate of behavior marked by certain signs and conditions that do or do not exist—shared respect, shared power, balanced economic distribution, and uncontrolled information (Fig. 14.27).

The students' questions were broad (see 1, 3, 4). The teacher sought to help the class watch the film for information which they could apply to themselves and their own behavior. (See 2 and 5.) Thus, a guide to the study of the film is most desirably a joint pupil-teacher effort.

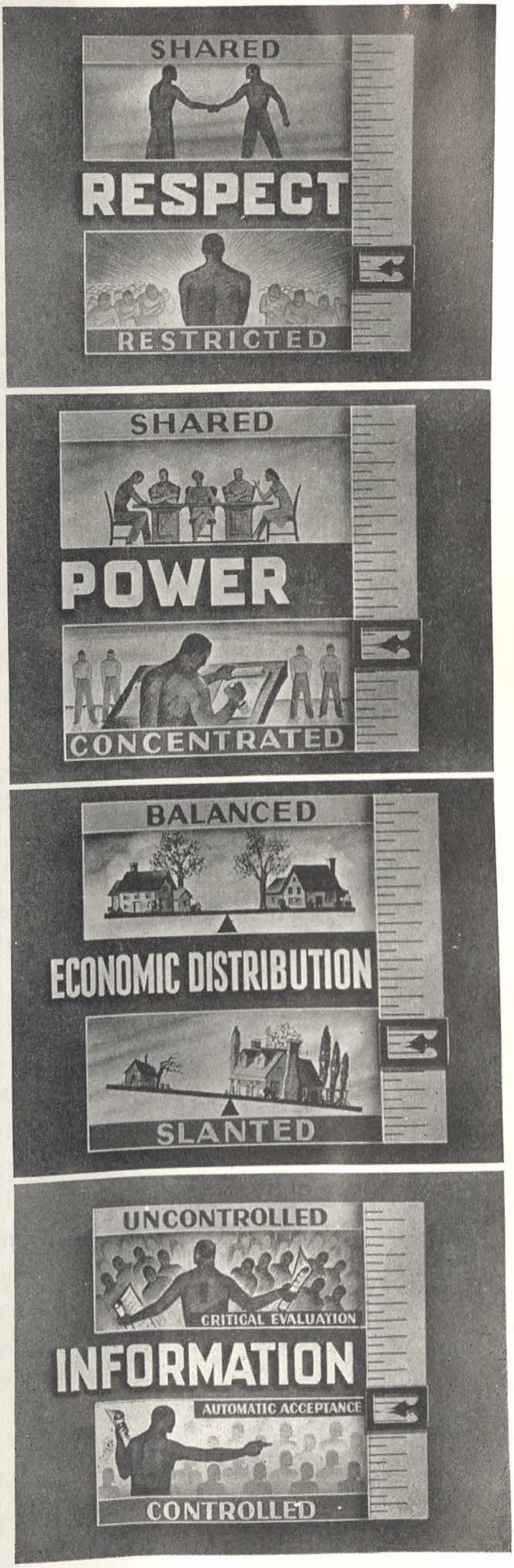

Fig. 14.27. The four characteristics of democratic living are shared respect, shared power, balanced economic distribution, and uncontrolled information. (From *Despotism*, Encyclopædia Britannica Films, Inc.)

Pupils and teacher (intermediate grade) planned the following study approach to the film *Paper Making* (Sound, B&W, 22 min., Coronet):

Things we want to find out while watching the film:

1. How did the Egyptians make papyrus?
2. What kind of printing paper did Gutenberg use? Was it similar to the paper we use today?
3. Is all paper made out of wood?
4. What kind of wood makes the best paper?
5. How is wood for paper taken out of the forests?
6. How is wood actually changed into paper?
7. How many kinds of paper are there?
8. Watch the film to be able to explain:
   a. Wood barking and chipping.
   b. Wood pulp.
   c. Calendering of wood fiber.

The teacher's concern for the specific steps in paper manufacture can be seen in Question 8. He knows that the film will not answer the first two questions, but he realizes that these are pupil-inspired and that ultimately the search for information will go beyond the film itself.

A study plan which is developed through pupil-teacher discussion assures more effective film viewing. The student approaches the experience with definite purposes in mind. Because they include his own purposes, he becomes identified with the process of learning from the film. Because he has helped formulate the purposes, he is likely to be interested. Through his own interest and his own purposes, more effective learning takes place.

4. *Create the best possible classroom conditions in which to view the teaching film.*

Because pupils work on day-to-day school projects in their own classroom, it is here that the teaching films should be viewed. Classrooms should be so arranged and equipped as to allow every pupil to see a well-defined image on the screen, and to hear without distortion or strain the sounds which accompany the film.

Before a film is shown, the projection equipment should be set up and properly placed in relation to the screen. The film should be threaded into the machine and the projector tested for focus and sound so that it can

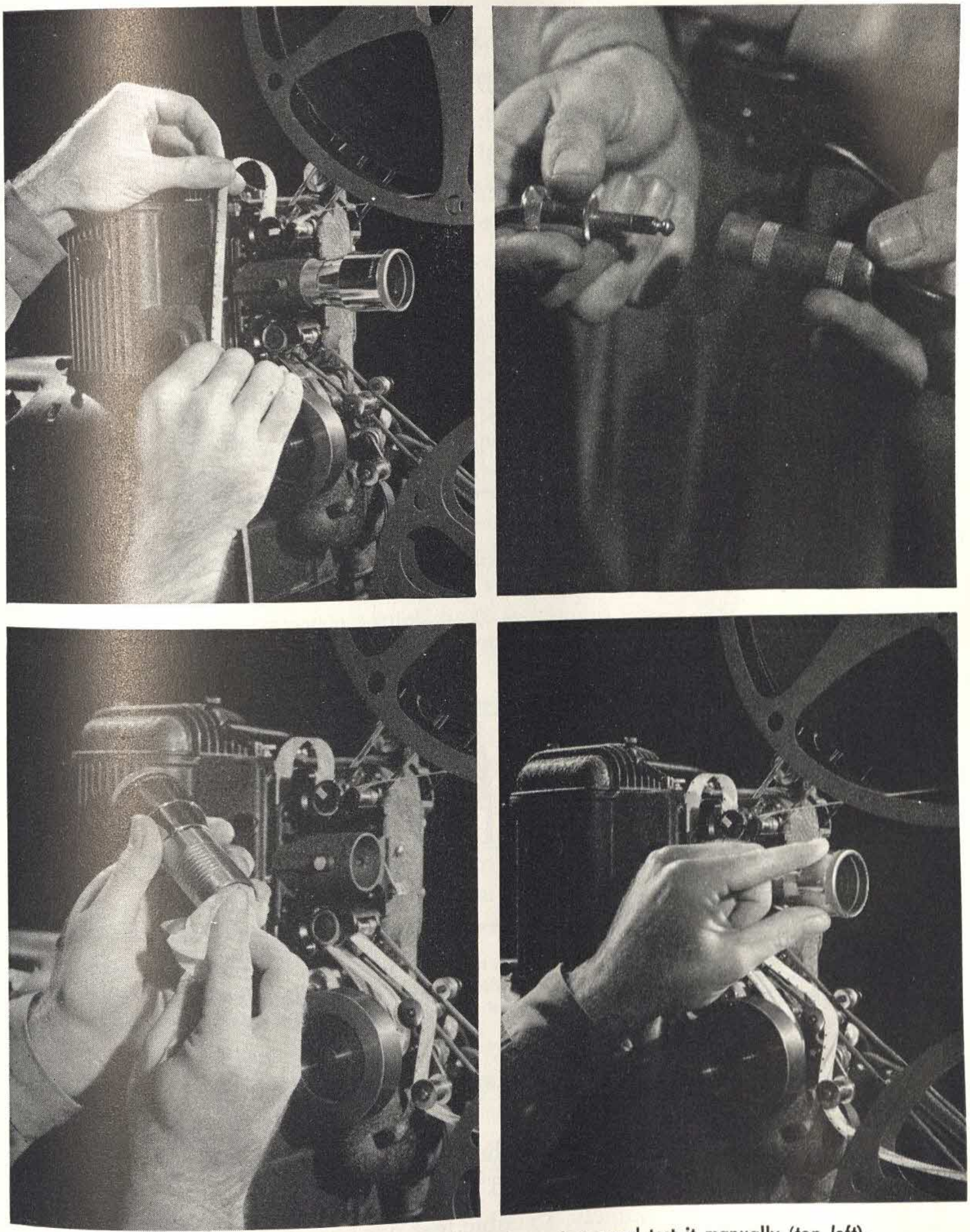

Fig. 14.28. Before the class begins, thread the film into the projector and test it manually (*top left*). Check all electrical connections (*top right*). Clean the dirt and grease from optical surfaces (*lower left*). Set the projector in motion, check the sound and the location of the amplifier, and adjust the focus. Then return the film to the beginning and turn off the switches (*lower right*). (From the film *Projecting Motion Pictures*, courtesy of the University of California at Los Angeles.)

be switched on the moment the class is ready to see the film as part of the learning activity.[42] (See Fig. 14.28.)

The screen should be of such size and so placed that all can see it perfectly. By walking from pupil to pupil, the teacher can quickly judge the viewing and hearing conditions for each child in the room. (See Fig. 14.29.)

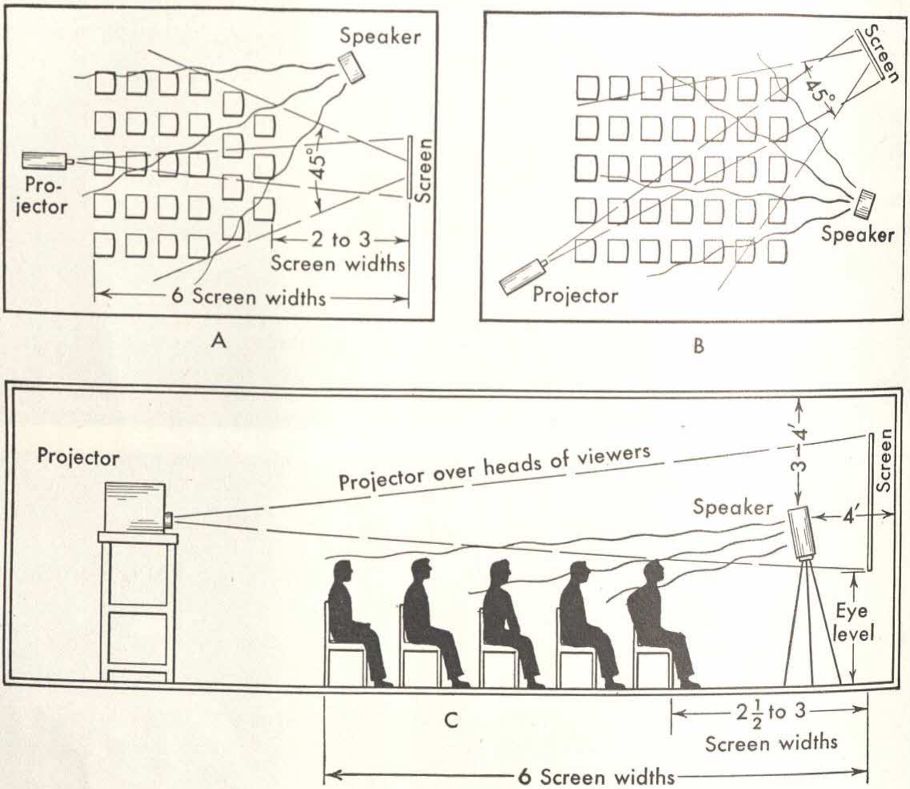

Fig. 14.29. Suggested classroom projection arrangements. *Top left:* in classroom with movable chairs or desks; *top right:* in classroom with fixed desks. *Lower:* projection over the pupils' heads. Place the speaker so that the sound comes at ear level or slightly above and is directed at the center of the listening group.

Room ventilation should duplicate the general air-change and circulation specifications recommended by school building authorities for regular classroom use, namely, 15 cubic feet per person per minute.[43]

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[42] *Projecting Motion Pictures,* Sound, B&W, 18 min., Educational Film Sales Dept., Extension Division, University of California, Los Angeles.

[43] National Council on Schoolhouse Construction, *Guide for Planning School Plants,* Nashville, 1949.

The acoustics should allow every child to hear lifelike, completely understandable tones from the sound track.

In general, classroom film projection arrangements should permit the class to give complete and interested attention to what is being revealed on the screen and through the loud-speaker.

5. *Give the children opportunities to evaluate the film learning experience.*

An effective way of evaluating this experience is to encourage pupil discussion after the film has been shown. The following record of one such discussion reveals a few of the learning outcomes gained by intermediate-grade children from viewing the film *Children of China* (Sound, B&W, 10 min., EBF):

TEACHER. Let's talk about some of the answers that we found [to the question, "Do Chinese children enjoy sports and games as we do?"].

JANE. They play checkers and some other games, too.

TEACHER. Did you find out anything else about sports? . . .

JOEL. Well, one of the boys wanted to go swimming, and I don't know the game they played, but then they played checkers.

TEACHER. That's right! Edith?

EDITH. I saw some girls jumping rope when they were at school.

TEACHER. Yes, just as you jump rope. But the important thing is that those children, just like you, are interested in sports.

EDITH. I found that their school is much like ours, but they read and write differently.

TEACHER. Yes, the main thing again, they have schools. . . . I don't think, Edith, that you could read that book [you saw in the film].

EDITH. No, I couldn't. They read backwards. They start from the back of the book instead of from the front.

TEACHER. Could you read their writing?

LEONORE. No. . . .

SANDRA. I didn't know they had Girl Scouts and Boy Scouts, too.

TEACHER. Do you think they have them all over China?

SANDRA (*with doubt*). Not all over. (*Silence from others.*)

(*Pause.*)

TEACHER. Well, we would have to find out, wouldn't we? We would have to do some more studying.[44]

Often during an evaluation discussion it becomes apparent that there is need for further study. This may involve turning to additional sources

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[44] American Association of School Administrators, *op. cit.*, p. 129.

of information, such as books, periodicals, filmstrips, recordings, and maps. Frequently the discussion awakens a need to refer to the film again. For example, the teacher asked, "What kinds of goods were sold in the shop at Kwan Shin?" Two or three scenes in the film showed exactly what was sold, but . . .

TEACHER. How many of you know the answer? (*Pause; no reply.*)

TEACHER. Well, that's peculiar. You all saw the film, didn't you? (*Children nod assent.*) (*Teacher continues*)—What do you do, boys and girls, when you have "read" something in your book and find you haven't all the answers? (*Pause; one hand appears.*)

TEACHER. What do you do, Sandra?

SANDRA. You do it over again.

TEACHER (*assuming a teasing tone*). Oh, my goodness! That's a boring thing to do! (*Children do not agree.*)

TEACHER. It's not? You mean that if you're really interested in finding out, you don't mind that? [*rereading*]

EDITH. No! (*Rest of children express agreement.*)

TEACHER. Well, what are we going to do about it? [the question of what was sold in the Kwan Shin shop] (*Hand appears.*) Rosemary?

ROSEMARY. We'll see the picture over again!

TEACHER (*again assumes teasing tone*). Would you *want* to see that [*Children of China*] again? (*General agreement.*) Well, boys and girls, that is exactly what we shall do. As we go on talking about the film, I'm sure we'll discover other things we didn't find out about or didn't see. We will then see the film again, but this next time we see it . . . what might be a good idea for each of us to do?

EDWARD. We'll look for the questions (the ones we didn't get) while we're seeing the picture and see if we can find the answers to them.

TEACHER. Which questions, Edward? (*Pause.*) All of the questions? (*Pause.*)

LEONORE. No, just the ones I don't know.

TEACHER. Yes, it becomes an individual job now, doesn't it? Each one of us will have his *own* task to do.[45]

Evaluation discussion can reveal to the pupil his own need for further study. It serves as a basis for (1) reference to additional learning materials, and (2) restudy of materials already used.

When the need comes from within the pupil, the restudy of a teaching film can be a purposeful and highly profitable learning experience.

A more formal evaluation can be made through the use of written essay or objective test questions. If a subject is complex and if mastery depends on an awareness and understanding of many related but detailed bits of information, a carefully planned series of questions is often desirable in evaluating learning outcomes.

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[45] *Ibid.*, pp. 131–132.

This method was used with the high-school film *Modern Weather* (Sound, B&W, 19 min., USOE):

> Test yourself on what you saw and heard in the film.
>
> To indicate the correct answer, draw a line under it, check it, or fill in the blank with the right word or words.
>
> 1. Water which is at rest may be set in motion by heating a portion of it, causing convection currents of water due to unequal temperature. .... TRUE FALSE
> 2. Convection currents of air may also be produced by unequal temperatures. .... TRUE FALSE
> 3. By heating air, its density is increased.................... TRUE FALSE
> 4. Warm air tends to rise because it is displaced by heavier cold air. .... TRUE FALSE
> 5. The rotation of the earth deflects the direction of convection currents of air.. TRUE FALSE
>
> The greatest heating of the air will take place near the (6) .... because at that location the sun's rays are more nearly (7) .... to the earth's surface.
>
> The speed of the rotation of the earth at the equator is approximately (8) .... miles per hour; at a point 30° north or south latitude it is approximately (9) .... miles per hour.
>
> The deflection of air currents as they move toward the poles is the result of the variations in the speed at which the surface of the earth is moving in space; therefore, the deflecting force is greatest at the (10) .... and zero at the (11) ....
>
> High altitude convection currents—cold, dry and dense—proceed from the equator toward the poles; due to rotation of the earth, they spiral to the (12) .... in the northern hemisphere and to the (13) .... in the southern hemisphere. Etc.[46]

Evaluation of the learning resulting from viewing teaching films is an essential step in any plan for the effective use of films in the classroom. It shows to what extent learning has been accomplished, and it can specifically define individual progress and individual needs for further work on the subject being studied.

6. *Provide for follow-up activities which develop naturally out of film viewing and are pupil-teacher planned.*

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[46] Visual Learning Guide for *Modern Weather*, National Audio-Visual Council, Chicago.

If the viewing of a carefully selected teaching film is a means of acquiring background or readiness experience, this film viewing can become the basis for countless follow-up activities in written expression, oral communication, art, number activity, project work, etc. These activities may cover a wide range, depending on pupil interest and ability, but teacher and pupil should plan them together.

After the film *Desert Nomads* (Sound, B&W, 22 min., United World) was shown to intermediate-grade pupils, the following planning took place:

TEACHER. Did we find answers to all our questions?

GIRL. I wanted to find out more about the foods they were preparing.

TEACHER. What did you discover?

GIRL. I found out how couscous is made [ground barley steamed over lamb broth], but the film showed they were eating other things, too.

TEACHER. If you're really interested in finding out about other "dishes" they prepare, what could you do about it?

GIRL. I could read books about it.

TEACHER. Yes, but are you going to be satisfied with just reading about their food?

GIRL. Could we make some of their dishes?

TEACHER. Not very well right here—but—who has an idea?

GIRL. I think Miss Weltin [Home Economics teacher] would let us try some recipes.

TEACHER. Where will you get the recipes?

GIRL. Maybe she has some, maybe the librarian would help us. . . .

TEACHER. Would you like to try? (*Eleanor responds enthusiastically.*)

TEACHER (*continues*). I'd like to have you try, Eleanor. Is anyone else interested? (*Several hands appear.*) Martha, Ruth, Geraldine and . . . O.K., Bob, you can join the group. Now you get together over there with Eleanor, she's your chairman, and plan exactly what you'd like to do. . . .[47]

Within a few days some interesting North African dishes were tried out in the Home Economics room.

Other groups did some simple reading research before constructing a "table-top oasis." Free reading practically exhausted the library shelf of stories laid in the desert regions, and descriptive accounts of desert areas, living conditions, and geography were eagerly sought.

A group interested in art worked their study information into a collective mural. Requests went to the music teacher to spend part of the hour on folk music of North Africa. A poem which one of the children found was adapted to choral speaking; and the blank space in the bulletin board was covered with pictures and news clippings, all pupil-arranged.

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[47] Recorded classroom experience of one of the present authors.

In a senior English class the viewing of the American Men of Letters series, which includes *Franklin* (Sound, B&W, 16 min., EBF), *Longfellow* (Sound, B&W, 16 min., EBF), *Alcott* (Sound, B&W, 16 min., EBF), *Cooper* (Sound, B&W, 16 min., EBF), *Jefferson* (Sound, B&W, 16 min., EBF), and others, led to a class-planned essay assignment, to "If they were alive today" radio interviews, reports on the independent reading of "works" not in textbook anthologies, and original "television" dramatizations of interesting episodes in the lives of these great Americans.

Films which show how-to-do-it procedures invariably result in the formation of groups headed toward creative efforts. Following the showing of a film explaining the preservation of milk in cheese form, the intermediate-graders interviewed store managers, dairy men, and druggists until they had the information they wanted. They then proceeded to test their information and make their own cheese.

After their study of housing, a junior-high-school group located specific films on brickmaking and concrete construction, and then located and assembled the actual materials necessary for what they finally accomplished, the making of crude but durable bricks.

Other follow-up activities growing out of viewing films include:

Film	Activity
Shy Guy, Sound, B&W, 13 min., Coronet.	Organizing a school "Welcome New Pupil" club.
Decimals Are Easy, Sound, B&W, 10 min., Coronet.	Interviewing local merchants about the use of fractions and percentages in business.
Language of Graphs, Sound, B&W, 15 min., Coronet.	Production of graphs and charts on the high-school activity budget, school team record, etc.
Maps and Their Meaning, Sound, Color, 15 min., Academy.	Construction of a terrain model of the local county.
Fundamentals of Acoustics, Sound, B&W, 11 min., EBF.	Testing the classroom and applying low-cost acoustic materials to ceiling and back wall.

The strength of the teaching film lies in its graphic portrayals. Film-inspired pupil activity is a natural outgrowth of viewing teaching films. Unless provision is made for follow-up activity intelligently planned by teacher and pupils, one of the greatest values of using educational sound films in the classroom will be lost.

A NEW TOOL FOR LEARNING

All of us have experienced moments when as teachers or learners we needed real experiences to help us understand. We have often recognized this need, but, finding no means of gaining the hoped-for experience, we have objectively recognized the gap between idea and practice and reconciled ourselves to it.

Let us now examine some of these situations.

SOCIAL STUDIES TEACHING—THEN AND NOW

In an earlier chapter we said that the traditional approach to the study of geography was through the printed word. Examples from early American textbooks were quoted. Even today it may be said that the major avenue of information open to the student of geography is the textbooks and the words, pictures, and diagrams they contain.

The teacher who attempts to help children become informed about faraway places soon realizes that the child who has spent his entire life in the metropolitan area of Philadelphia or the semi-arid valleys of the Palomar Range of southern California has had very little background experience to apply to his study of a distant region unlike his own home. His experience will be of little help when he tries to interpret words which describe the homes, the witch doctors, the crafts, and the food-getting habits of the Mangbetu tribe of the upper Congo River basin.

Likewise, the child who has had no first-hand experience with the "ghats of the Ganges," the "rain forests of the Malay valley regions," or the "adobe-walled courts of a family of Acapulcans" will gain many fanciful and even untrue impressions from the words which attempt to describe them.

American school children cannot understand children of the Sudan until they have had experience with those children. Verbal descriptions of dress, dwellings, family relationships, etc., have the fullest meaning for the children who have seen the children whose dress, homes, and customs the words describe.

. Teachers know this and want to remedy it, but it is for the most part beyond reach. The teacher says, "To give the best instruction in geography we must go 'there' to see for ourselves. But we cannot. So we will continue to do the best we can with the traditional materials."

This need no longer be the case. Today cameras can be sent to any part of the world. Teachers and curriculum experts can decide what experiences are to be filmed and what sounds are to be recorded. The resulting sound films can be duplicated and projected in any social studies classroom, at the time the teacher believes the film will help the pupils the most in their study.

Consider the motion-picture film *Desert Nomads* (Sound, B&W, 22 min., United World). For children who live in the United States it is rather pointless to read or talk about the "standard of living in the Sahara region." It is seldom that even the teacher can base his descriptions on actual experience.

However, after the children see this well-planned film, they will have all but lived in a group of five families for several weeks. They will have stood beside the water clock as it measures off the time allotted each of the oasis farmers for irrigation. They will have watched and listened to the camels nipping the thorny foliage from the desert plants. They will have listened to, watched, and all but actually participated in the experiences of people who dwell on the other side of the earth. Consequently these children can now interpret the term "standard of living" as it applies to the Sahara region. The 16 mm. sound motion-picture film has been their means of gaining direct background experience.

Let us recall how American history was taught twenty-five years ago. Students examined wall charts containing crosses, dotted lines, and other symbols. They read accounts of battles, treks, and hardships. Their texts contained portraits of historic figures, black-and-white steel engravings of Old World architecture, and a woodcut or two of sailing vessels. Pupils listened to historical descriptions spoken by a teacher who sincerely and honestly tried to describe incidents which he had never experienced but instead had learned about through much the same medium as his pupils used—books. Neither teacher nor pupil had ever "been there" to witness any of the historic episodes.

TEACHING

A film can show
- SKILLS
- ACTION
- BACKGROUND INFORMATION
- FACTS

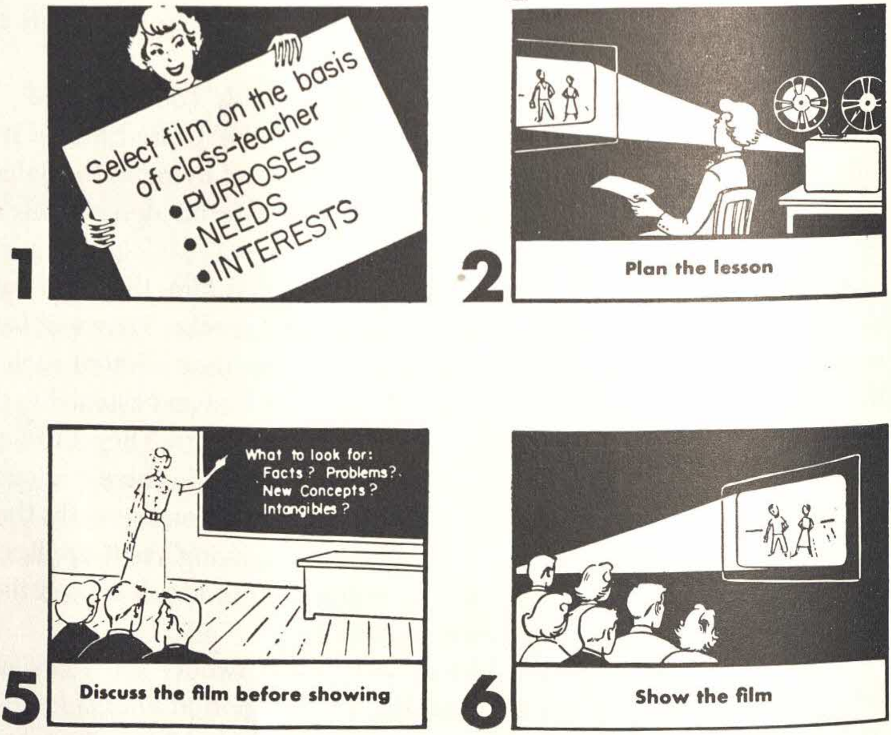


Fig. 14.30. (Courtesy of Los Angeles City Schools.)

History teachers have no doubt often said, "If it were only possible to have lived then as well as now, if only we could turn back the clock, if we could see for ourselves—but of course we cannot."

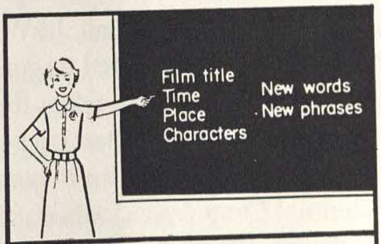
The school today, however, can come very close to actually experiencing historic events. Through the medium of the 16 mm. sound motion-picture film we can reconstruct the circumstances of history. We can rebuild homes, castles, farms. Museums can supply costumes, utensils, and

with a FILM

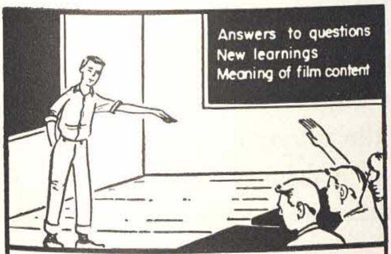
A film can also

BUILD ATTITUDES
STIMULATE EMOTIONS
DEVELOP PROBLEMS

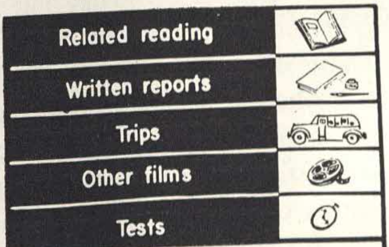
3 **Make use of other materials**



4 **Tell class about the film**



7 **Discuss the film after showing**



8 **Engage in follow - up activities**

other authentic historical paraphernalia. The skilled historian, through research, can duplicate the patterns of speech and pronunciation. Finally, skillful cameramen can photograph the carefully planned reënactment of historic events that have present-day social significance.

Heretofore the school child had little real understanding of covered wagons, sod houses, and the pony express. Candle making, soap making, and shot pouring were only interesting-sounding expressions. Such abstract terms as "privation," "frontier spirit," and "pioneer hardships" were empty phrases to the school child in the modern world of push-button conveniences.

But today, well-photographed sound motion pictures can reconstruct lifelike experiences in our country's history for any child any place, whenever a teacher wishes. Today we can land with the Pilgrims at Naumkeag. We can spend that first winter in Salem, Massachusetts (*Early Settlers of New England,* Sound, B&W, 10 min., EBF). Thirty years later we can go down the Ohio River on a flatboat (*Flatboatmen of the Frontier,* Sound, B&W, 10 min., EBF). We can spend a month in Fort Harrod, Kentucky (*Kentucky Pioneers,* Sound, B&W, 9 min., EBF). Later we can cross the western plains in a covered wagon (*Pioneers of the Plains,* Sound, B&W, 10 min., EBF), be there when the pony express (*Pony Express,* Sound, B&W, 10 min., Arthur Barr) leaves St. Joseph, Missouri, stand next to Sutter (*California's Golden Beginnings,* Sound, Color, 19 min., California Centennial Commission) when gold is discovered on the west coast.

Today the 16 mm. sound film can help any child "relive" the history of his country. After such first-hand experiencing, teachers can assign reading in texts and supplementary reference books with added assurance that they will be understood by their pupils.

SCIENCE TEACHING—THEN AND NOW

There is need for lifelike experiencing during instruction in the sciences. Many a science teacher faces the difficulty of securing first-hand information. The stars are too distant, the microbes too small, the life cycle of the turtle too slow, the action of a drop of liquid too fast, the smelting of metal too hot, and the solidification of mercury too cold to allow first-hand observation.

By tradition the science teacher has been in the vanguard in devising simulated real learning experiences. He has pioneered in demonstration work, in field studies, in painstaking observation. But frequently he comes to an impasse:

> It is spring and we're talking about the growth of a plant. We want to tackle the problem thoroughly. If we want to watch that plant grow, we must have someone there all the time recording the things that happen—the seed producing a plant, gathering energy from the sun, and producing its own seeds. What we might do is go outdoors, work up a garden plot, plant the seeds, and say to

Johnny, "Sit here and watch it grow." But that is both impractical and impossible.

We can record the complete life cycle of the seed as it develops into a plant by *time-lapse photography*. An exposure made every few minutes, and results projected at the rate of twenty-four pictures per second, can condense three months of growth into ten minutes. During a single class session the complete story can be told of what happens from the time we drop the seed on fertile ground until the adult plant produces new seeds. This experience has been captured for all to see, and see as many times as is necessary for complete learning.[48]

Thus through the sound motion-picture film both teacher and pupils can explore man's natural environment. The motion-picture camera can document nature in almost any of its aspects. The depths of the waters can be probed for information on fish (*The Sunfish,* Sound, B&W, 10 min., EBF), crustaceans (*Shell Fishing,* Sound, B&W, 10 min., EBF), or water insects (*Pond Insects,* Sound, B&W, 10 min., EBF). The most inaccessible land areas can be documented for information about water buffalo (*African Fauna,* Sound, Color, 9 min., Simmel-Meservey), geological formations (*Glacier National Park Studies,* Sound, Color, 22 min., Simmel-Meservey), or the universe itself (*Story of Palomar,* Sound, Color, 41 min., California Institute of Technology). And when the ideas exist only in the minds of men, the motion-picture film can create tangible explanations of them through animation and its accompanying photography (*Molecular Theory of Matter,* Sound, B&W, 10 min., EBF; *The Work of the Kidneys,* Sound, B&W, 10 min., EBF). The number of films currently produced in the field of science is sufficiently great and the films are effective enough to warrant the attention of teacher and subject specialist alike.

SUMMARY

The 16 mm. motion-picture film offers many opportunities for the improvement of instruction. Through basic motion-picture techniques such as direct photography, changing-speed photography, photomicrography, and animation, great areas of desirable but heretofore inaccessible instructional experiences and visualized explanations can now be brought into any classroom.

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[48] W. A. Wittich, "New Tools for Learning," *School Executive,* September, 1948, p. 4.

Two broad types of sound motion-picture films are being used in classroom work: (1) the basic teaching film and (2) the supplementary teaching film. The latter, while produced for other purposes, is often found useful in instructional situations.

The classroom use of teaching films has revealed many values: pupil interest is heightened, more learning is accomplished, the retention of learned material is more permanent, and interest in reading is increased.

The teacher who uses films in the classroom must accept new and increased responsibility if they are to be used with greatest effectiveness. As is the case with most new inventions, the people who use them intelligently and effectively automatically accept additional responsibilities in order to enjoy their advantages.

It is the teacher's responsibility to choose wisely from large numbers of teaching films those which will make the greatest contribution to the classroom situation he seeks to create. In selecting, he must consider such characteristics as authenticity, grade level, curriculum purpose, quality of photography and sound, organization, and study helps.

The greatest responsibility is incurred when the teacher actually prepares to use the film in the classroom. The film should never be accepted as a mechanical substitute for good teaching. Rather, a carefully selected teaching film is a tool of instruction which, wisely used, can bring results in terms of interest, learning, and pupil activity far beyond those heretofore accomplished with traditional learning materials.

Other teacher responsibilities for using films in the classroom include awakening pupil interest and desire to learn, conducting vocabulary study before the film is shown, planning with the pupils their purpose in seeing films, providing good classroom conditions for film viewing, and providing for pupil and group evaluation and for follow-up activities that are planned with the pupils.

In the hands of an intelligent, well-trained, and understanding teacher, the teaching film can be a vivid, interesting, dynamic, and socially useful instrument of instruction.

Suggested Activities

1. Refer to the diagrams in this chapter on the motion-picture camera and projector, sound recording and reproduction. Use them to help explain:

   a. How the simple action of walking across the room is photographed by the motion-picture camera.
   b. How the above simple action (or any other one you may choose) is projected on the screen so that the illusion of motion is created in the mind of the viewer. Why is this illusion created?
   c. How sound is recorded on the film. How sound is reproduced from film.
   d. How and why almost all sound motion-picture projectors are basically alike.

2. Learn to operate as many kinds of 16 mm. sound motion-picture projectors as are available for class use. View the film *Projecting Motion Pictures* (Sound, B&W, 18 min., University of California at Los Angeles), and discuss good room arrangements and projection techniques.
3. Preview many sound motion pictures. Secure the films from such sources as the teachers college or university film library, public-school audio-visual director, public library, local representatives of industry, county agent, county medical officer, Red Cross office, local commercial film dealer, etc. After previewing the films:
   a. Classify them as basic or supplementary (subdivide the latter).
   b. Locate, project, and discuss the educational significance of the portions of these films which employ direct photography, changed-speed photography, photomicrography, and animation.
   c. Judge the effectiveness of these films in terms of the criteria in the film selection guide on page 395.
   d. Keep records of your film previewing. These records will help you become aware of and conversant with the "literature" of teaching films. You will want to refer to these records in searching for effective teaching material that will be useful for specific units of work.
4. In terms of your own subject-matter interests, select a film and plan for its effective use in a teaching situation. Note the six responsibilities the teacher accepts when using a film in the classroom (see pages 398–414), and keep them in mind as you make your plan.
5. Arrange to put your plan into use. Either as a teacher in your own classroom or as a student teacher in a "practice classroom," introduce, project, evaluate, plan for, and guide the follow-up activities for your film.
6. Keep a diary of the pupil reactions, questions, and outcomes you note while the film lesson continues. At the completion of the lesson, consult this diary and evaluate your success or oversights in terms of the above six responsibilities.
7. Following this self-evaluation, select another film and plan to use it in the classroom. Afterward, record results and again evaluate your effectiveness in teaching with films.

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15. Television in Education

For the first time in history we can be in two places at once, an eye-and-ear witness of two events that are going on simultaneously. We can "live" the events in our own school rooms, homes, or offices, and at the same time, on a television screen, see and hear what is happening a thousand miles away. A person may live in Middletown, Illinois, but be a first-hand observer of events in Washington, New York, and Chicago.

No longer must reporters and radio analysts report "edited" news to you. "You are there" with television. The only "editing" which can be done with television is to shut out part or all of what is being televised.

Just as the fascination of watching things happen draws children and adults to the edge of the excavation being dug by the five-ton power shovel, so the action on a television screen holds the undivided attention of the viewer. The radio listener can sew, cook, play games, even study while the usual radio program is on, but not the televiewer. T.V. is a medium that demands the full attention.

In the spring of 1951 gripping evidence of the influence of television was demonstrated during the Kefauver Committee's investigation of crime in the United States:

> A gripping real life drama—the senate crime committee hearing starring William O'Dwyer and Frank Costello on television—brought a drastic, if only temporary, change today in the daily routine of millions of persons.

> Housewives neglected their chores, husbands put aside work, and business in stores and theaters slumped as millions watched in fascination.
>
> The mass preöccupation produced a social phenomenon and topped even the annual fall interest in the world series.
>
> The day-long hearing Monday, featuring O'Dwyer's debut and a return engagement by Costello, was televised in 20 cities along the eastern seaboard and in the Midwest.
>
> One estimate placed the total of "lookers" at 20,000,000 to 30,000,000.[1]

This was reported similarly by *Time:*

> . . . Last week, as millions sat glued to the telecasts of the Manhattan hearings of the Senate Crime Investigating Committee, television was for once accompanied by a glowing sense of civic purpose. . . .
>
> The research firm of Videodex reported that 69.7% of New York's sets were turned on—more than twice as many as during a weekday World Series ball game last year. Brooklyn's Red Cross chapter had to ask Senator Estes Kefauver to urge its women workers to go out and push a fund-raising campaign drive instead of sitting home watching T.V.[2]

Television is a powerful medium. What it will be five years from now is a matter of conjecture. The greatest concern of those who are currently involved with both entertainment and educational T.V. is that this medium is in danger of going the way of entertainment radio and Hollywood films. This danger and challenge are aptly summarized by Graham Hutton:

> The [entertainment] film industry has "entertained" the massed millions of our western world; yet its future and finances are alike uneasy . . . and, by its own admission, it fails to "hold" the adult population over the age of thirty or even less—the majority of voters and adults. And consider sound radio. In American private-and-sponsored broadcasting, it has become "mere entertainment." Yet its failure to "hold" adult society is self-confessed and partly explains the clean sweep television is making—itself doomed to go along the same rails.
>
> It would be a tragedy—to be bitterly regretted and dearly paid for—if television were henceforth to identify its aim and purpose with the fatalistic functions of the cinema, the comic strips and the [other] modern equivalents of the Roman amphitheatre.[3]

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[1] Associated Press release, March 20, 1951.

[2] *Time*, March 26, 1951, p. 80.

[3] Graham Hutton, "The Challenge of Television," *British Broadcasting Quarterly*, Winter, 1950–1951, pp. 193 ff.

Television gives the best of information, it gives the worst—there are people who will support either side of this point of view.

Television, say some, is fast becoming the reason for upsetting the school study program:

> A survey at Burdick Junior High School in Stamford, Connecticut, revealed that students were spending 27 hours a week at their television sets—55 minutes a week less than they spend in classes. In a few cities administrators have expressed concern about lower marks, which they trace directly to television's monopoly of students' time (Clifton and Roselle, N.J.; Cleveland, Ohio).[4]

This is also good, for it demonstrates the great interest children find in television. It challenges the school to use this interest for desirable ends—T.V. educational programs, current events telecasts, better parent control of viewing habits, and better evaluation and appreciation of existing television programs.

Parents voice both acclaim and concern over what television is doing to home life. According to Professor Paul A. Witty of Northwestern University, it is a real problem "chiefly in homes" where the parents permit it to become one.

> While some parents polled felt that television stimulates the thought and imagination of children and widens their interests, 48% of those who replied expressed dissatisfaction with T.V. According to one Evanston teacher, the children invariably do not select programs of educational value, but the action-packed, gory, thrill-laden presentation.[5]

While this may at present be the case, the fact remains that the school child could have watched such important current events on his home T.V. set as United Nations conferences and debates, the launching of the newest and largest merchant ships, the President's news conferences, *Vanity Fair, David Copperfield,* and the latest news reports on United Nations forces overseas.

Other fears are voiced. Will T.V. make our youth a nation of shut-ins? Will it interfere with reading? Will excessive viewing impair health and sleep habits, cause eyestrain?

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[4] Letitia Willett, "Television, Boon or Bane?" *Scholastic Teacher,* November 1, 1950.

[5] Paul A. Witty, address before the Thirteenth Annual Reading Conference, University of Chicago, June, 1950.

One school principal, Joseph Barlow, has no such fears. According to him, "T.V. has knit families more closely by helping to refind one another in the family group which each evening gathers around the living room T.V. set."[6]

Out of this controversial thinking some concrete evidence has emerged.

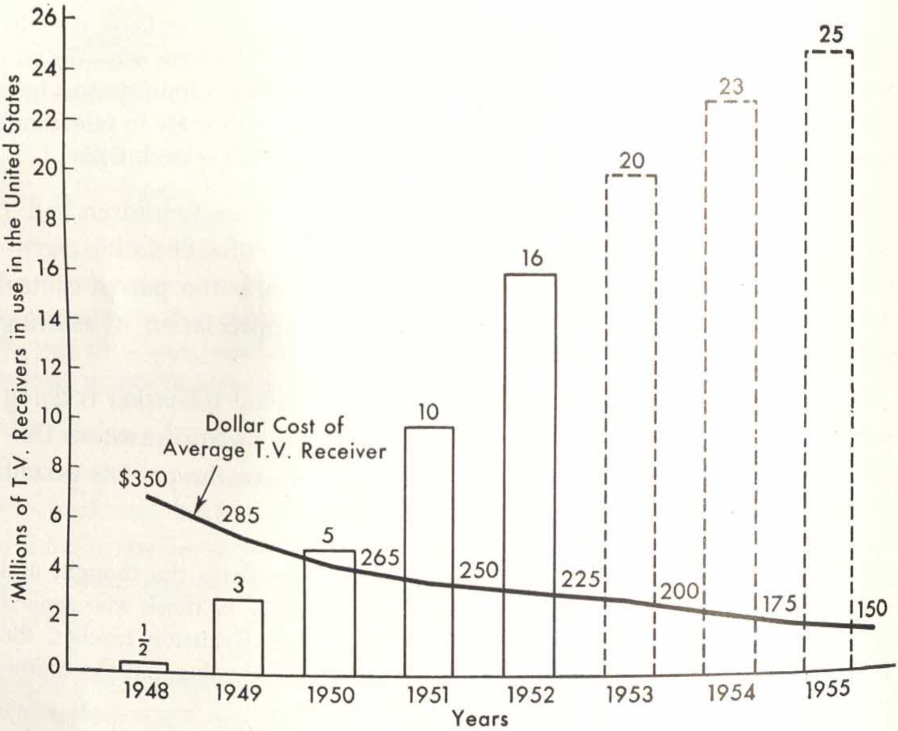

Fig. 15.1. Number of television receivers in use in the United States and trends in cost of receivers. (Figures for 1948 and 1950 adapted from Wayne Coy, "The Present Status of Television," *Journal of the A.E.R.*, March, 1951, p. 64; 1951 figures adapted from "Where Does Television Go from Here?" *World Week*, April, 1950, p. 6; 1952–1955 figures are authors' estimates.)

Television is here and with unprecedented speed is finding its way into more and more American families.

The statistics in Fig 15.1 show the trend in public acceptance of this new means of communicating ideas. From a point of none except experimental use in 1945, the public is purchasing millions of T.V. sets each year. Manufacturing facilities are expanding so rapidly that the 5,000,000 sets that were produced in 1950 have been far exceeded today. Meanwhile the average cost of an efficient home television receiver has decreased with the appearance of each new model. Furthermore, increasing numbers of new telecasting stations are being licensed to operate over newly expanded channels which today extend from coast to coast. It was estimated that, in 1952, 60 percent of the nation's population lived within reception range of network or local television, that there were 65 television cities in the United States, and that 108 television stations were in operation.[7]

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[6] Joseph Barlow, in the Milwaukee *Journal*, special T.V. supplement, September 17, 1950.

The future is clear. Just as today the average home has more than one radio, so it will soon have more than one T.V. set. Just as today radio broadcasting stations, both commercial and educational, are numbered in the thousands, not the hundreds, so also will it soon be with television stations. Just as today thousands of radios bring valuable learning experiences into our science, literature, and social studies classrooms, so too will this soon be true of television.

Television program production is rapidly emerging from the first, exciting "anything will be watched" stage. Already a few children and adults are selecting better and more instructional programs. Many programs are truly educational—reports, on-the-spot news telecasts, high-quality dramatic and musical performances. As better and more socially desirable programs are produced, the school will find among them some which may be rightfully considered useful learning materials for the classroom.

HOW TELEVISION WORKS

Television is a means of converting a scene into an electronic image (Fig. 15.2). This image is sent through space, picked up on an antenna, and translated into the original scene on the surface of a picture tube or, to use the correct name, kinescope.

ANALOGY WITH THE HUMAN EYE

The television process is remarkably similar to the visual process of the human eye. Light waves reflected from an object strike the lens of the eyeball, which focuses these waves onto the retina as an image of the

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[7] Based on "60% to Be in Television Range for Political Conventions," Milwaukee *Journal,* March 30, 1952.

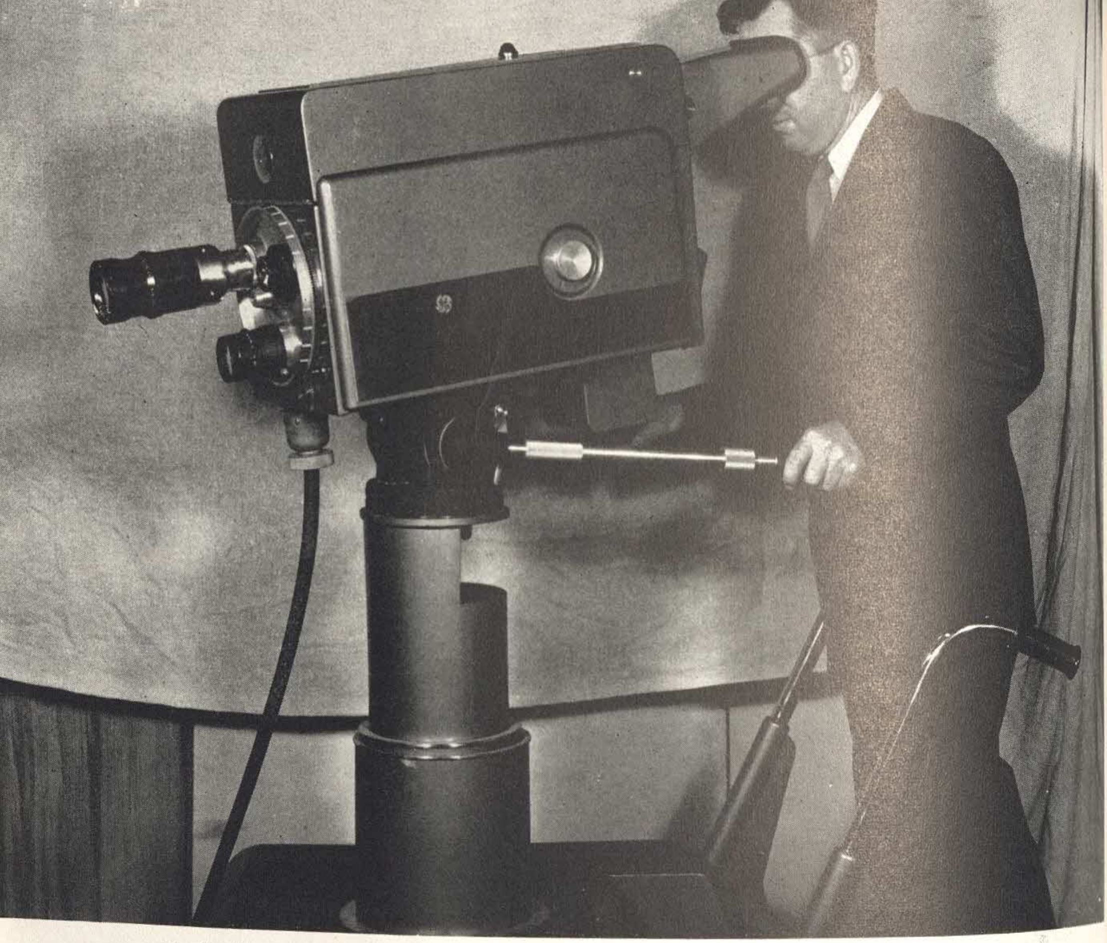

Fig. 15.2. Pictures are converted to their electron counterparts in this television camera. (Courtesy of General Electric Corp.)

object seen (Fig. 15.3). So with the television camera or "eye"—it too moves and focuses.

The retina contains myriad nerve endings which are sensitive to light and which "record" each tiny portion of the image that falls on the retina. Similarly there are thousands of tiny light-sensitive "nerve endings" on the television camera "retina" or plate. These react to the strong and weak light areas in the image received.

In the human eye, the optic nerve carries the light signals from the thousands of retinal nerve endings to the brain, where the "picture" of the object being viewed is perceived. In the television camera, minute electric currents are "swept" off the surface of the light-sensitive "retina" by a scanning beam and carried in sequence over a signal beam which is telecast to the "mind" or picture tube. These signals are re-created on the end surface of the picture tube as the original scene "observed" by the television camera.

LIGHT, ELECTRONS, AND LIGHT

Scientifically, television cannot be described except electronically. It is a mechanical-electrical means of converting light patterns into electric impulses and then into light patterns. These changes must occur so rapidly and so continuously that the human eye continues to see after all of them have taken place.

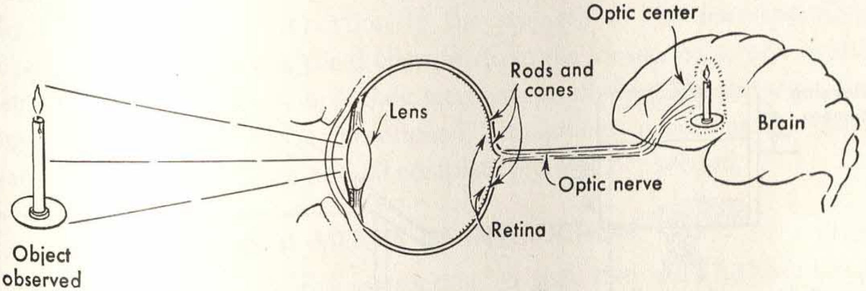

Fig. 15.3. How the eye functions.

As in the motion-picture film, so in television; a scene appears, disappears, and is replaced by another still scene many times each second. Thirty complete images appear on the camera plate, and therefore on the kinescope tube, every second; this is rapid enough to give the viewer a mental impression of motion. (See persistence of retinal impression, page 352.)

How pictures are televised is shown in the schematic drawing in Fig. 15.4, which shows a television camera, amplifier, aerial, antenna, and picture tube or kinescope.

Sound and pictures are sent over the air simultaneously by means of radio. A camera tube records light patterns and changes them into electrical impulses by means of a plate (*P*) which, covered with hundreds of tiny chemical eyes, is very sensitive to light. The lens of the camera focuses the picture to be televised onto the surface of the plate. Since all the picture images are combinations of lighter and darker areas, the plate changes the light striking its surface into corresponding electrical charges, which are then sent to the target (*T*).

The charges are swept off the target in single file by a scanning or "sweeping" beam (*EB*); hence the whole picture is not sent out or tele-

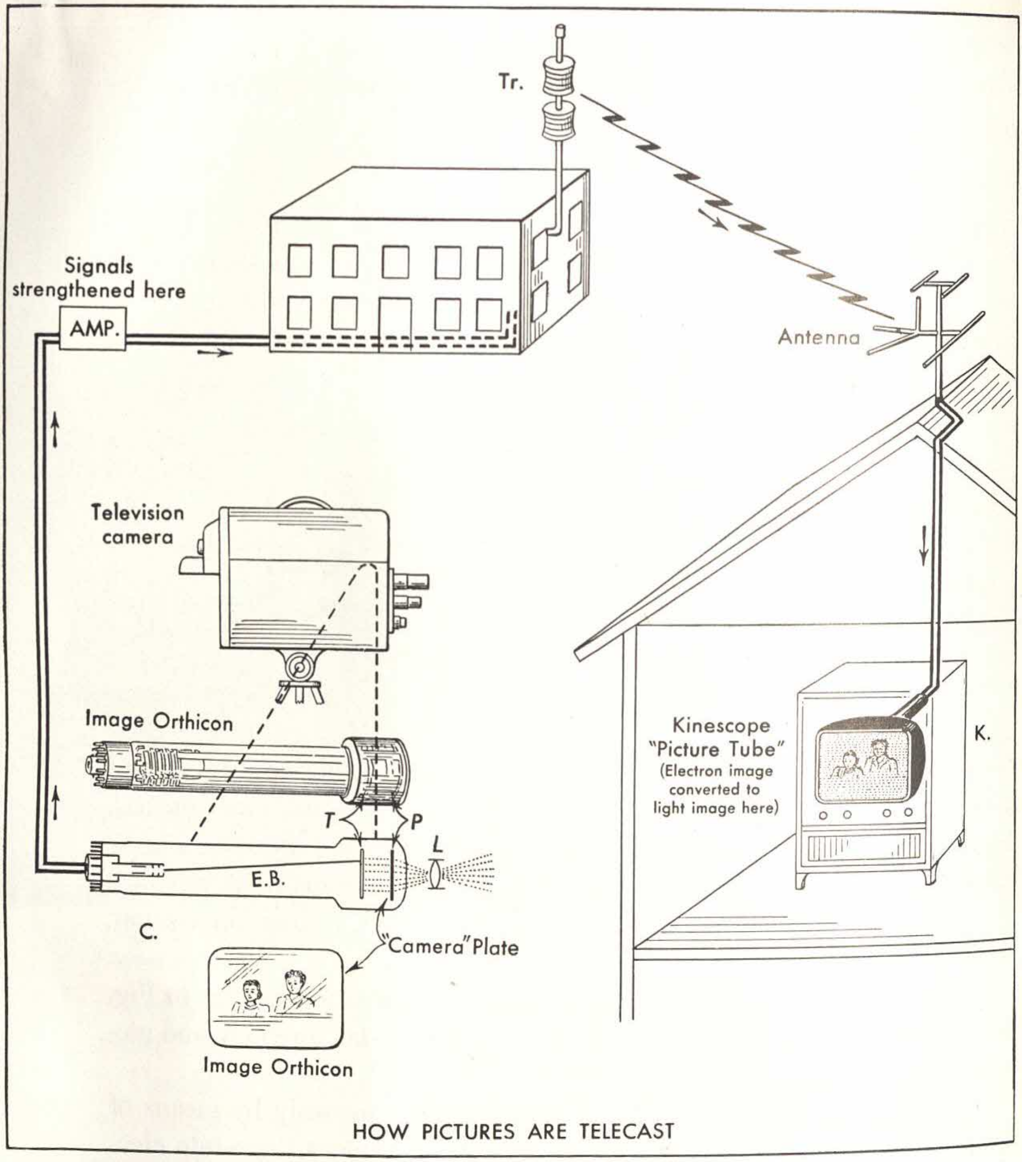
Tr.
Signals strengthened here
AMP.
Antenna
Television camera
Image Orthicon
T
P
L
E.B.
C.
"Camera" Plate
Image Orthicon
Kinescope "Picture Tube" (Electron image converted to light image here)
K.
HOW PICTURES ARE TELECAST

Fig. 15.4. Diagrammatic explanation of television. Follow the sequence of action beginning at the lower left. (Based partly on material supplied by RCA Victor Division.)

cast at once. Rather, the beam sweeps back and forth across the target and travels in an interrupted descending path from top to bottom of it, creating a continuous signal or message. The scanning beam sweeps the signals at the rate of 4,000,000 per second, fast enough for 30 complete images to be swept from the camera target every second. This signal is then strengthened or amplified (*AMP*) and transmitted (*TR*) into space.

The reverse process occurs in the picture tube or kinescope (*K*). When the signals are intercepted by the receiving antenna (*AN*) they are led to a receiver, where they are selected or tuned, amplified, and then led to the small end of the kinescope. In the same order in which these charges were swept off the camera target, they are instantaneously scanned or sprayed onto the inside surface of the large flat end of the kinescope. This end of the tube is coated with a chemical like that used in fluorescent lights, which is sensitive to electrical charges. As the electrical energy variations are "sprayed" against the kinescope, they are transformed into light that varies in proportion to the strength of the corresponding charges. Since these electrical charges strike the kinescope screen in the same order as that in which they were swept off the camera target, an identical picture image is reproduced. This process occurs at the same rate—4,000,000 impulses and 30 complete pictures per second.

TELEVISION AS A MEANS OF INSTRUCTION

Telecasts are materials of instruction. As such they may be compared with more familiar audio-visual materials. Depending on the subject-matter content conveyed, television may include maps, globes, or charts, or sound motion-picture films. Illustrated lectures and demonstrations can be conveyed by television, and slides, models, and specimens can be brought into the classroom by it. Television can be the medium by which the pupils are transported to dangerous, inaccessible, but important places not feasible for field trips.

Any place in the world that is accessible to a television camera crew is a possible subject for audio-visualization; thus television can claim the composite teaching advantages of many audio-visual materials. Unfortunately, although its possibilities are well known, little has been done to exploit this new tool for learning.

A beginning is being made, however, in many school systems in the United States. In 1951 Franklin Dunham reported that 56 colleges and universities, 4 medical schools, 19 public schools, and 2 public libraries were producing television programs.[8] In almost every case these programs were televised over commercial stations, the notable exception being the State College of Iowa at Ames, with Station WOI-TV.

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[8] Franklin Dunham, "Educational Institutions and Systems Render Public Service Through Television," *Higher Education,* April 1, 1951, p. 175.

In that same year, 12 colleges and universities representing almost every major geographical area of this country applied for television licenses.[9]

Television programs useful in classroom work are currently of three kinds:[10]

1. Those produced for the general public but applicable to school situations.
2. Those planned and produced by school authorities for regular classroom use.
3. Those which telecast existing audio-visual materials that are used effectively in school situations.

PUBLIC TELEVISION IN THE SCHOOL

When is a television program entertainment? When is a program which has been designed for general consumption useful in the classroom?

The greatest single consideration in selecting any instructional material for school use is whether or not it presents an additional desirable learning experience. This must be determined by those who examine television programs originally produced for other than school use. (See the film selection guide on page 395.)

Many valuable programs are televised during school hours. If the teacher makes it his responsibility to know about them in advance of the class period, if he selects programs which are useful in connection with the subject currently being studied, he can provide his pupils with added experience with their world.

Periodic weather reports are televised from Washington, D.C. These are more than solely verbal reports, for the verbal explanations are supported by weather charts showing thermal zones, storm fronts, isobars, and pressure zones. What better demonstration is available for science classes studying the atmosphere and weather?

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[9] "Twelve Colleges Apply for Television Licenses," *Higher Education*, April 1, 1951, p. 179.

[10] In discussing educational television programs, you must make a basic assumption. Either your school owns or has access to a television receiver, or you wish to explore the possibilities of television for future use in your school or classroom.

Fig. 15.5. Television cameras and microphones are newcomers to the traditional operating-room scene at Johns Hopkins. They provide close-up views of operating techniques to medical students and surgeons. (Courtesy of *The Johns Hopkins Magazine*.)

The same station also carried a program about art in architecture. Line drawings, models, slides, and photographs were used by a renowned architect to show the influence of old and modern art on contemporary architecture. His carefully planned description was verbal *and visual.* A lifetime of experience and study was drawn upon for his telecast to an unknown audience. Too few members of art and social studies groups saw that program.

A west coast advertiser planned weekday telecasts of classical and contemporary music. During the "show" the cameras moved around above the various performers. The viewer watched the fingers of the first violinist, then observed the trumpeter as he delicately fingered the keys of his instrument, then saw the tympanist produce a crashing crescendo. Is this an experience for adults only? Or is it a model of hoped-for attainment to be shown to instrumental music classes in the junior high school?

The tele-lanes are crowded with cooking and sewing demonstrations, but every so often an expert chef or a highly skilled dress designer will demonstrate a technique of his art which cannot help but be an effective supplement to the more routine courses of study in home economics. Such programs should be used in the classroom.

The wealth of current events telecasts is beyond description—Congress in session, United Nations proceedings, the city fathers in action, news reports, and illustrated reports by the sanitary engineer, the superintendent of water supply, and public works construction engineers. All of these should be scrutinized by the history and social studies teacher who seeks to relate contemporary living with the individual student's understanding of his role in society.

These possibilities were all considered by George Jennings, director of radio in the Chicago public schools, when he said: "Consider carefully what is being broadcast [telecast], consider its educational implications; promote interest in an in-school use of such programs as seem to fulfill most of the requirements of an educational telecast as we see them."[11]

The existing general television programs, if carefully selected for their ability to bring added and desirable experiences into learning situations, represent a valuable entry to the field of educational television for those who are interested in the possibility of improving instruction through

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[11] George Jennings, "The Present Status of Educational Television," *Journal of the A.E.R.*, January, 1951, p. 40.

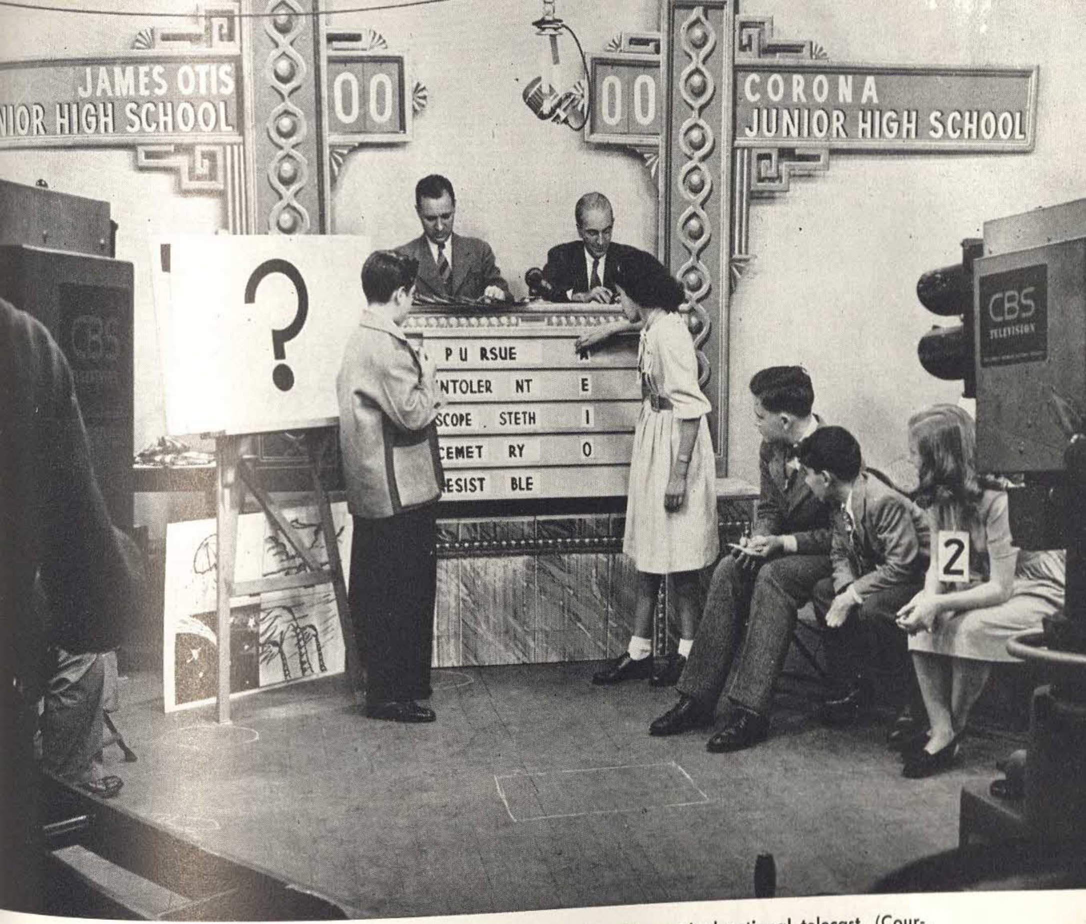

Fig. 15.6. Pupils from many junior high schools participated in this quasi-educational telecast. (Courtesy of *See and Hear*.)

this medium and who have access to television receivers that are sufficiently large to permit good viewing in the classroom.

SCHOOL-PLANNED TELEVISION PROGRAMS

A beginning in school-planned television programs is being made in the United States. Such programs vary from quasi-school telecasts planned largely by network systems, to programs that are planned and produced by the school itself. The "All New York Junior-High-School Television Quiz Tournament" (Fig. 15.6), planned and produced by a New York City network and the Board of Education, is an example of the first type of telecast.[12]

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[12] Edward Stasheff, "Television Adjunct to Present Visual Materials in Public Education," *See and Hear*, November, 1947, p. 23.

School use of television will reach full stature, however, only when the school itself assumes complete responsibility for planning and producing T.V. programs. Television must present a useful instructional opportunity beyond what is possible with traditional materials already at hand. Television that only approximates what is already being done in the classroom contributes little or nothing that is new.

School-planned and -produced television programs do exist in many cities in the United States, among them Atlanta, Baltimore, Boston, Buffalo, Chicago, Cleveland, New Orleans, Detroit, Minneapolis, Philadelphia, New York, Los Angeles, St. Louis, and Washington, D.C.

In cities where television is accepted as an effective part of school work, two basic kinds of program are produced:

1. Those based on community resources.
2. Those which record current events of social importance.

The following summary of these types is by no means all-inclusive, for new experiments in the use of television in school are going on daily.

Community Resources Programs

Midway in a discussion of crime and its effects on society, a civics teacher commented: "What we need in our classroom today, boys and girls, is someone who knows a lot more about crime apprehension and control than I do."

What teacher has not admitted similar thoughts in watching a group of young people develop keen interest and curiosity about a specific area of information?

With television, the person in the community who knows most about fingerprinting, for example, can appear in every classroom simultaneously to demonstrate crime detection and fingerprinting procedures (Fig. 15.7).

In Philadelphia, a series of school-planned and -produced television programs depicts the community and its people in action. The television camera is taken into government offices, hospitals, remote transportation control offices, and places where other usually inaccessible yet highly important community functions are carried on. The television camera can go where a group of pupils cannot. It can record and send the record into classrooms where society in action is being studied.[13]

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[13] Martha Gable, "Television in the Classroom," *School Executive*, April, 1950, p. 70.

Fig. 15.7. (From *The School Executive*, courtesy of American School Publishing Corp.)

School television should not compete with existing teaching materials or techniques. Rather, its role is to go beyond them. A laboratory which is air-conditioned, whose exacting routine would be dangerously upset if visitors were to walk in, can be observed distinctly and safely by the television "eye" and its observations flashed to classroom viewers.

An interview with a visiting authority, demonstrations by skilled craftsmen, lectures, recitals by talented artists can be brought to and shared by every learner through television. The expert in art, home economics, government, or international affairs can demonstrate his skill and discuss his ideas in a "person to person" way by television. A skilled guidance worker can explain and demonstrate the giving and scoring of standardized tests. An outstanding physical education teacher can demonstrate games which primary-grade children may wish to try during the spring semester. Student paintings, safety posters, and science models, and outstanding accomplishments in dramatics, speech, music, and literary expression, can be carried, via school television, to every pupil in the schools (Fig.

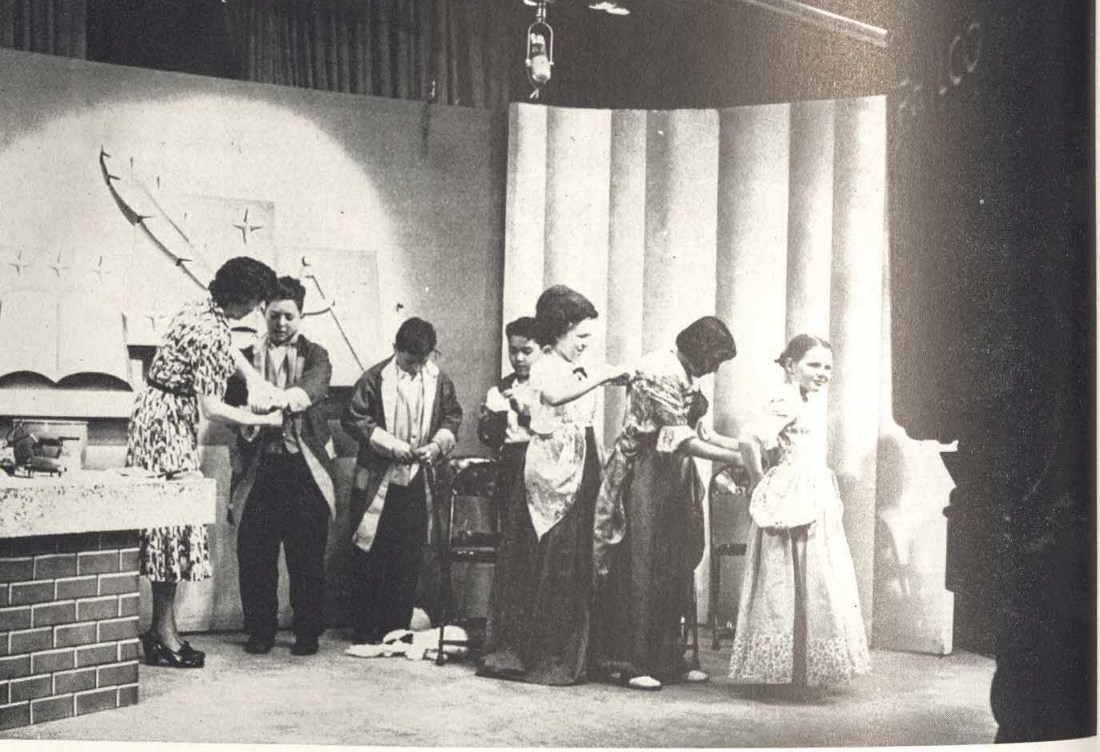

Fig. 15.8. These pupils are to demonstrate their activity in American history to schoolmates and parents via television. (Copyrighted photograph used by courtesy of Philco Television Broadcasting Corporation and the School District of Philadelphia.)

15.8). Thus the children may inspire or be themselves inspired by the other pupils.

School television is the means by which the individual student can be best and most realistically introduced to his community—its people, industries, science, and government.

As is the case with all instructional materials, problems confront the successful use of television in school. Program time schedules have to be reconciled. Duplications or one-sided emphasis of programs have to be avoided through careful planning. Discrimination is required, because school television sometimes merely duplicates the contribution of other audio-visual materials and techniques.

To overcome these problems, school television programs must provide opportunities for additional learning experiences which go beyond the fixed format of the 16 mm. sound film and which involve unique and desirable audio-visual experiences that contribute to learning (Fig. 15.9).

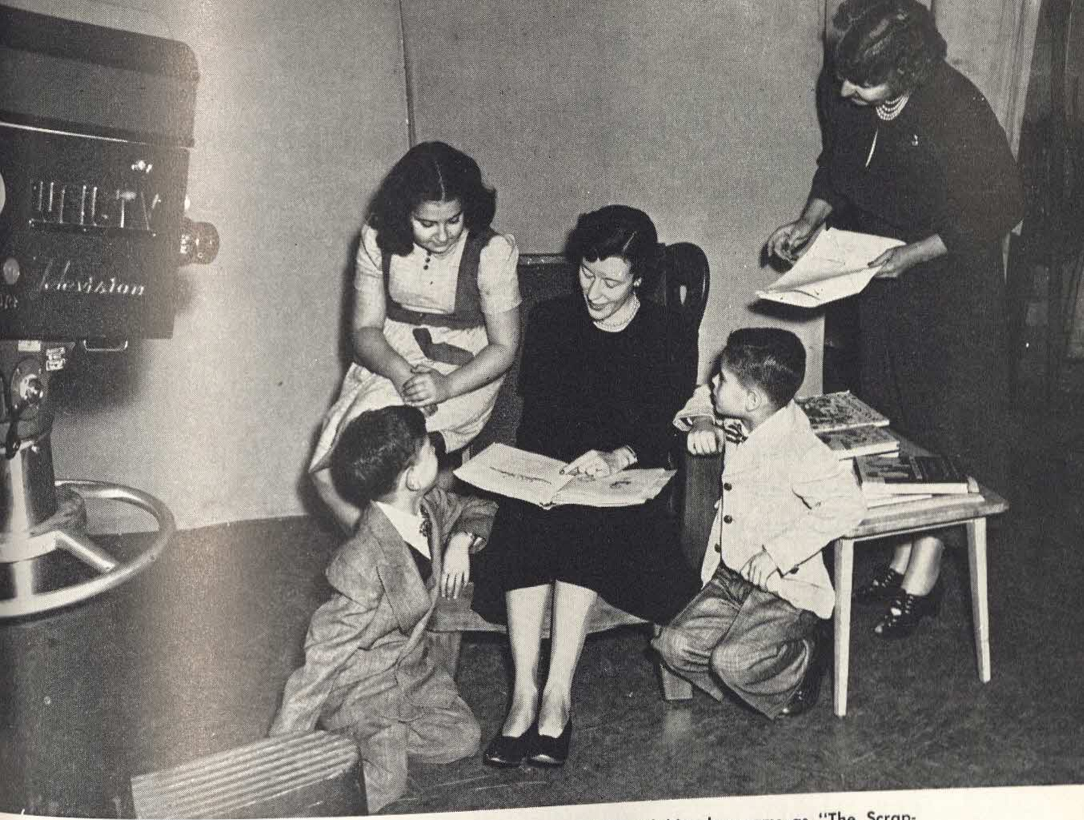

Fig. 15.9. Additional learning experiences are brought into Philadelphia classrooms as "The Scrapbook," a school-planned program, is telecast. (Courtesy of the School District of Philadelphia.)

Current Events Programs

It has been said that the highest purpose of education is to prepare young people to take their place in society and to strive to improve it. This implies an active interest in and a knowledge of current history.

Current history surrounds the learner; it happens continuously, and all around him. Developments in science change the direction of his purposes and his life. The laws that are made, the policies of the State Department, the action of the common council or city manager, the decisions of the United Nations Security Council—all these immediately change the relative significance of everything that is taught in school today.

Thus, another important role of television in the school is to report briefly and understandably on the course of current history.

"Public Health," a school program televised twice a week, describes new health ordinances. Models, charts, and specimens are used to explain how health and inspection ordinances protect the safety and happiness of school children and adults.[14]

"Science Is Fun," another school program, explains how recent scientific discoveries and inventions affect the way we live.[15]

In "You Are There!" a news telecast for schools, maps, news film excerpts, and interviews with experts are used to interpret the effects of current events on everyday living.

History in the making can be organized into useful television learning materials for school use. Competent teachers should edit the news in terms of what is important. Current news relating to the everyday study of science, literature, social studies, and fine arts is important. Television can bring this important news into the classroom either as edited reports or, better still, as on-the-scene camera records of current history in progress.

TELEVISED AUDIO-VISUAL MATERIALS

A radio program that is worth preserving for replaying, relistening, or rebroadcast can be transcribed on disks or on tape. (See Chapter 10.) Similarly, a television program that is worth "saving" or "recording" can be recorded in visual and audio form by kine-photography. Kine-photography is a means of making a continuous sound and motion-picture record of a television show while it is being telecast. A kine-photographic record of a television program is in essence a sound motion-picture film.

Hence, we may then ask: Can existing sound motion-picture films be used as material for television programs? Can slides and filmstrips be thus used? Can maps, models, charts, specimens, demonstrations, etc., be used similarly?

The answer to all these questions is yes. All audio-visual materials today are "props" in the hands of those who are planning and producing school television programs.

The use of audio-visual materials in television begins with charts, diagrams, models, specimens, chalkboards, maps, slides, filmstrips, etc. From there it extends to the 16 mm. sound motion-picture film itself, which can be televised much the same way as it is projected on a screen.

Many sources provide 16 mm. sound films for television. These include the producers of educational sound films and entertainment films, film-producing agencies of foreign governments, and the producers of sponsored films (see pages 538–545).

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[14] *Philadelphia Public Schools Television Schedule,* March, 1951, p. 5.

[15] *Ibid.,* p. 2.

"Today approximately 75% of all available educational films can be secured for television use on a free or rental basis. In the future this percentage will be even higher because currently produced films are being cleared for television as a matter of routine."[16]

The school use of televised films is illustrated by the programs produced and telecast by the Iowa State College Station, WOI-TV:

Wednesday—United States travel films (16 mm. sound), *Crusade in Europe* (true-photographic record), *Our Earth* (16 mm. sound).
Thursday—*Operation Home Making* (combination film with T.V. narration), *Sightseeing at Home* (16 mm. sound), and *Development of Communications* (16 mm. sound).[17]

Literally thousands of sound films have been used as television programs. Some are shown in their complete form; others are edited or cut to be inserted at special points in televised talks, descriptions, or demonstrations.

That the use of entertainment films in television has changed the viewing habits of adults is shown by the following: "Television is credited with forcing neighborhood movie theaters to close in many parts of the country. Los Angeles closed 91 theaters in the past year. San Francisco closed a 1,800-seat theater; Oakland a 1,500-seat house. Seattle closed 25 theaters; Boston 10. One circuit in Chicago closed 3 houses."[18]

Many changes will be necessary before 16 mm. sound films can be freely adopted for school television. Some of the shortcomings of the existing sound films used in television are summarized as follows by Tom Noone and Maynard A. Speece:

1. Sound films contain many long shots which do not record well over television.
2. Films usually contain more detail than records well over television.
3. Existing color films do not record well on television. Black and white are better.

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[16] J. J. McPherson, "Educational Films in Television," *Higher Education*, April 1, 1951, p. 181.

[17] "Programs on Television Announced," Des Moines *Register*, February 22, 1950, p. 23.

[18] "Television and the Movies," *English Journal*, March, 1951, p. 170.

4. Film-frame margins do not coincide exactly with television camera or picture tube margins.
5. Film titles and credits designed for projection on a large screen are often not readable on television screens.
6. The length or screen time of films does not fit well with television program timing.[19]

Since television is a fusion of visual and audio sensations, it offers rich opportunities to verbalize about objects, specimens, models, demonstrations, charts, etc., in creating valuable learning demonstration experiences.

A chart or map of the region is a useful visual reference for a teacher or pupil who is telecasting a description of a trip to a distant place. Maps or a globe is necessary for the student or teacher who is reporting and interpreting the week's current history. Tables, stoves, refrigerators, and a host of kitchen utensils are audio-visual materials for the student or teacher in demonstrating the preparation of a vitamin-balanced meal. An array of laboratory apparatus is an integral part of a television demonstration of the nutritional effect of controlled diets.

Great care and preparation should be given to the use of audio-visual materials because the time and effort thus spent will be many times repaid in terms of the number of learners who see the final televised program.

SELECTING AND USING TELEVISION PROGRAMS

Although many communities are now producing school television programs, it must be acknowledged that a very small percentage of pupils in the United States are within receiving distance of school-planned and -produced telecasts. In view of this, what opportunities and responsibilities confront the teacher who is interested in school television?

Before answering this question we must assume that the classroom is equipped with a television receiver suitable for class use. Sixteen inches is certainly the minimum size for screens for classroom use. Screens 18″ x 30″ are available. Although more expensive, they provide an acceptable viewing area for the average-size classroom 28′ x 32′.

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[19] Adapted from Tom Noone, Maynard A. Speece, and Kenneth M. Gapen, *A Television Report*, Films Section I, Radio and Television Service, Office of Information, U.S. Department of Agriculture, June, 1950, p. 11.

SOURCES OF SCHOOL TELEVISION PROGRAMS

The teacher who is considering using television programs has, in most cases, only one practical and steady source to choose from—commercial telecasts.

Since all kinds of programs come over commercial channels, the teacher must develop criteria for selecting and using the few that will contribute to the pupils' quest for socially useful information. To do this wisely, three factors must be considered:

1. The unique characteristics of educational telecasts.
2. Techniques for the selection of telecasts which will be useful.
3. Responsibility for the wise use of telecasts in the classroom.

When these three factors can be reconciled, the teacher can be reasonably sure that a television program has been well chosen and wisely used.

CHARACTERISTICS OF EDUCATIONAL TELECASTS

Television programs which are useful in supplementing school learning situations must present an opportunity to bring additional valuable experiences into the classroom. A person does not have to look at television for very long before realizing that most programs are the counterpart of entertainment films and radio programs. Such telecasts contribute little or nothing to the learning situation.

Since television is similar to the 16 mm. sound film in that it presents lifelike impressions of real-life experiences in terms of sight and sound, similar characteristics may be ascribed to educational telecasts.

1. Educational telecasts can re-create the past through dramatizations, films, or lectures.
2. Educational telecasts can take the viewer to remote and inaccessible places by means of visualized reports by travelers and explorers, films, or specially arranged television documents, either "live" or kinephotographed.
3. Educational telecasts can "observe" and explain natural and scientific phenomena which are too small, too slow, too fast, or too dangerous to be observed first-hand. This can be done by means of expert demonstrators, by sound films either complete or edited, or by kine-photography.

4. Any aspect of the environment which is known to man or is hypothesized about by him can be prepared for audio-visual presentation and telecast.

It is the responsibility of school people to select and use television programs which accomplish such aims as the above, and to discourage the superficial soporific types of programs which too often are the main offerings of commercial telecasting.

TECHNIQUES FOR SELECTION

The selection of a telecast suitable for instructional use is similar to the process of evaluating and selecting sound motion-picture films for use in the classroom. (See pages 398–414.)

As in selecting any audio-visual material of instruction, the basic question to be answered is: Does the telecast make a contribution to the learning situation beyond that made by instructional materials already in use? The answer must of course be yes.

A unique problem that confronts the teacher in evaluating and selecting a telecast is the fact that there is no possibility of preview. Therefore, judgment must be based to a great extent on previous experience with the program series. The reputation of the sponsor or producer, the caliber of the expert, authority, or demonstrator who appears on the program, the care taken in organizing the telecast—all will help the teacher decide regarding the probable usefulness of both current and future telecasts. In general the reputation of the producer and participants will be of continuing importance in this connection.

The same considerations regarding curriculum validity and suitability of the subject for the grade apply as surely to telecasts as to other audio-visual materials: (1) Is the general level of the program keyed to the age of the group that will see it? (2) Is the content of the telecast of such a nature that it will contribute to a better understanding of the subject being studied? Does the program include useful supplements to the unit of work or the general curriculum area? (Here again, inability to preview necessitates the teacher's knowing the general purposes and content of the television program.)

Finally, the mechanical quality of the telecast itself must be evaluated. For example, is the program of high quality? Here also, as the teacher becomes increasingly expert in judging the quality of all instructional materials, his knowledge of the general quality of television programs will influence his judgment about the usefulness of a forthcoming telecast.

THE WISE USE OF TELECASTS

The teacher's responsibility in planning for the use of a telecast in the classroom is closely allied to his responsibilities in planning to use other audio-visual materials such as filmstrips, sound motion-picture films, transcriptions, radio broadcasts, etc. (See pages 398–414.)

Before the telecast, the teacher should provide activities which will heighten the pupils' interest, which will motivate. The children should be encouraged to talk about the program in anticipation of gaining information from it. They will soon recognize their responsibility for following up television viewing by applying what they have seen to the whole range of school activities.

The teacher's greatest difficulty in planning to use television programs is, of course, the inability to know the exact content of forthcoming programs. This will always be true of original telecasts of "live" programs. Kine-photographic programs, however, can be previewed.

IMPROVING PUPIL STANDARDS OF VIEWING

No longer can the school afford to overlook the tremendous impact of home television programs on children and teen-agers. Studies already referred to indicate the great and demanding power of television on the interests and time of school children.

> Television viewing for the school child should not only be limited as to number of hours, but along with the quantity of shows viewed should go the equal (perhaps even more important) consideration of the quality of shows viewed.
> Only the parent can enforce limited viewing and selective viewing, *but both the teacher and the parent have a responsibility to the child* (which is seldom appreciated by the growing youngster) *to find out about television* and the programs that enter the home.[20]

The school must carefully study the television viewing habits of the children and, more important, take steps to improve their standards of appreciation. The responsibility of our teachers is to understand television thoroughly and to help the children develop higher tastes in the interest of their present and future growth.

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[20] Richard Goggin, *National University Extension Association Bulletin,* March, 1951, p. 8.

School children do a great deal more televiewing at home than they do at school. Reference has already been made (page 425) to studies which reveal that the time spent looking at television at home is roughly comparable to the total time spent in school. Hence it is very sound to suggest that pupils spend some time and effort, while in school, in trying to understand the real social worth of the programs they see. Such questions as these might well be asked of the pupils: Why do you watch television programs? Does televiewing bring useful information to your attention? Should it? What telecasts do you enjoy most—Travel? Historical events? Foreign places? The lives of great men? Did the telecast teach a lesson in human behavior? Was the program well directed, well organized? Did it contain patterns of good English usage? Was the program true? Did it give information which was useful to you in your class work? Discussion of such questions as these in a language arts class will obviously bring about a change in attitude regarding the kind of telecasts young people consider worth seeing.

An evaluation score sheet such as the following can be used in judging the effectiveness and social worth of home television viewing. Each question should be answered fully and pertinent comments noted.

Name of program .... Network .... Time ....

My estimate: Excellent ____|____|____|____|____|____|____ Poor

1. Was the television story worth while? ....
   ....
   ....
2. Did the television program contain information which will help me in my daily living? ....
   ....
3. Did the television program present information which will help me in my school work? ....
   ....
4. Was the television program well presented? Was it well organized? Did it represent clean fun? Did it present desirable speech and action, etc.? .....
   ....
   ....
5. Was the acting well done? ....
   ....

6. Was the program clear-cut, vivid, and well defined as it came through on my receiver? ....

....

7. Were the costuming and scenery well done? ....

....

TELEVISION TOMORROW—A SUMMARY

Television can become the ultimate in communication. It can probe any corner of the world. The teacher can see what the television camera records either immediately, or later through kine-photography, as his teaching schedule permits.

Television can be a vital force in our classrooms. It records the present, anywhere, and it can be transcribed and thus become part of the library of audio-visual instructional materials.

To understand and learn from television requires no intermediate training in number systems or verbal symbols, only vision and hearing. Television speaks intimately to the viewer. A person needs only to watch a television program to become aware of its "direct report to you" feeling.

Television sets are expensive at present, but each new model brings decreased costs and increased efficiency.

The school of tomorrow can and must have receivers in individual classrooms as well as large screens for televising to large groups.

> As an integrated part of school curriculums, television opens up horizons which today only hint of the great role television may eventually play as a teaching medium, for here the educator, the student, and studio personnel cooperate in the planning, production, and presentation of programs designed to meet specific needs.
>
> It is only when television is approached from this viewpoint that the full impact of its versatility is appreciated. To present simultaneously to thousands of eyes the details of a single microscope slide, the intricacies of a surgical operation, the panorama of a city's industries at work! To incorporate these details into programs planned to illustrate classroom theory! To bring the classroom alive with the drama of textbook subjects brought to life![21]

At the adult level television can be the counterpart of the New England town meeting. Groups discussing contemporary political issues, legislatures in action, public officials at work, the building of public works and visual reports of public affairs can be televised to every family group. ". . . Television's great contribution to education will be the combination of these advantages of timeliness, immediacy, and realism in one medium, plus its ability to teach people without requiring their assembly in a classroom."[22]

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[21] *The Modern School Looks at Television* (service booklet), RCA Victor Division, Camden, 1951.

In the future everyone may, if he wishes, see the work of the greatest or the most remote civil servant via television. He may watch a great surgeon at work as he applies his skill in a complicated operation. He may see the laboratory techniques which led to the discovery of a new wonder drug. He may witness United Nations representatives as they debate and present evidence on infant mortality, public education, or the monetary stability of Iran, Pakistan, or Java. Television can and should become the pathway to man's enlightenment; it can and should be his emancipator.

In our schools, classroom television can be the responsibility of the textbook publishers and film producers who will dare to assume the responsibility for implementing the planning done by curriculum supervisors, administrators, parents, and teachers.

School television equipment can and should include closed-circuit intraschool two-way systems for the supervision, visual intercommunication, and self-evaluation of pupils and teachers in the course of their work. The equipment can and should be capable of receiving the audio-visual materials of instruction which will be telecast over multiple channels by a central transmitter. This multiple channel service will allow a teacher to ask for and receive a given televised film, filmstrip, or chart in his own room while at the same time teachers in other classrooms will receive the televised audio-visual materials they have selected, at the exact time they are needed to implement the subject being studied. In addition, the school equipment can and should be capable of receiving programs originating outside the school, including news and current history telecasts, demonstrations by experts, and other important programs televised not only to the schools but to the community.

Even today technical equipment has been developed through which every one of these ideas may be fulfilled. The school of tomorrow will continue to carry on the most important function of society—the social development of society's most important resource, children. To meet that responsibility well, no cost is too great. The cost of school television certainly is not great in terms of its social and educational value.

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[22] Earl J. McGrath, *The News Letter*, February, 1951, p. 3.

Television approaches the ultimate in mass communication of ideas. It is a means of converting a scene into an electronic image, and sending that image through space to be received and translated into its original visual form for the benefit of those who wish to see it. As such, television is an amazingly complex phenomenon which is capable of recording, sending, and reconstructing 30 complete pictures per second, which in turn means that 4,000,000 electron impulses are telecast per second.

Television has had a remarkable growth. From a small number of experimental sets in 1946, the year 1950 saw receivers installed in over 10,000,000 homes in less than 10 percent of the land area of the United States, for at that time vast areas of the country were still without television facilities.

As is the case with all communication media, the school has great responsibilities in selecting and using telecasts; in producing television programs by school people, about school subjects, for school use; in imparting better televiewing habits in school children; and finally in installing the necessary television equipment in schools and classrooms so that television programs can become an inherent part of classroom instruction techniques.

The science of television, as it relates both to the public and to the school, is undergoing a rapid transition. It began by emulating earlier modes of communication—the radio, the 16 mm. sound film, and traditional audio-visual materials. However, it is rapidly taking its place as a new and entirely different means of communicating information.

During this period of transition, the teacher is confronted with the responsibility of examining television programs as a means of improving classroom learning. Primary responsibilities include continuous selection and evaluation of the programs which emanate from commercial sources. Secondary responsibilities include evaluation of public and home televiewing habits so that steps may be taken to elevate general televiewing tastes and appreciation.

Equally important is the responsibility of school administrators and teachers to equip their classrooms with satisfactory television sets. All school systems should be conducting investigations of the possibilities of producing and telecasting useful educational programs.

Television can and should be added to the array of audio-visual learning materials which enable the school children of today to become realistically aware of the world environment which they must know about and in which they will live.

Suggested Activities

1. As an individual student or as a member of a committee, conduct interviews or a questionnaire study among the students of a local grade school. Obtain information such as the following:
   a. Number of children whose families own television sets.
   b. Time spent each day or each week in televiewing.
   c. Time spent in listening to the radio before and after the family had the television set.
   d. Time spent in reading before and after the television set was installed.
   e. Time spent in going to the movies before and after the television set was installed.
   f. Television programs most frequently watched.
   g. Programs which are forbidden by parents.
   h. Programs which are encouraged by parents.
   i. Changes in sleeping habits since the family bought the television set.

   Prepare a report on your investigation and discuss the implications of your findings. Repeat the study with high-school pupils.
2. Visit the nearest commercial or school telecasting station. Investigate such factors as:
   a. Methods of producing or selecting television programs.
   b. Attitude of program manager toward school telecasting.
   c. Nature of the audience.
   d. Studio facilities.
   e. Physics of telecasting.
3. Visit a classroom in which television is used. Note such aspects of the program being televised as:
   a. Preparation made prior to televiewing.
   b. The fixing of pupil goals.
   c. Removal of barriers to understanding the program.
   d. Follow-up discussion and evaluation.
   e. Follow-up activities.
   f. Effect on pupil interest and initiative.
4. During a one-week period watch your home television set as much as possible. Apply the criteria in the evaluation score sheet on page 446. Prepare a summary of your monitoring activities and discuss its implications for:

   a. The home viewing habits of children.
   b. The effect of home viewing on patterns of behavior.
   c. The effect of home viewing on school relationships.
   d. The possibility of using selected commercial programs in improving classroom instruction.

5. Compile a glossary of television terms beginning with such words as the following; search for other terms.
   - Brightness: the average overall brilliance of the television image.
   - Channel: a frequency band six megacycles wide for the transporting of a television signal.
   - Coaxial cable: a specially constructed cable used for carrying a television signal.
   - Electron beam: a stream of electrons constrained and focused into the shape of a beam by external magnetic fields.
6. View such films as *Coaxial* (Bell Telephone Company), *Sightseeing at Home* (General Electric Company), and any others you can locate on the subject. Report on how such films can be used to impart a better understanding not only of the techniques of telecasting but of their implications in terms of general education. On the basis of your knowledge of existing telecasts, select a television program which you believe will enrich classroom learning, and prepare a study plan for its use.
7. Make a simple diagrammatic layout that will permit a typical group of children to watch television in the classroom effectively. Specify the kind of set and indicate the location of equipment, etc., so as to visualize the classroom layout.

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16. Case Examples of the Use of Audio-Visual Materials

Various audio-visual materials have been discussed individually in preceding chapters. The purpose of the present chapter is to demonstrate through case examples how these visual instruction materials, strong in and of themselves, are even more powerful when used together.

A film may be an effective learning experience *per se*. A field trip may bring much new information to the learner who took it. A map can be a means of becoming acquainted with the world. Books have untold values. When film, field trip, maps, and books are carefully coördinated by planned use, the learning that results can be much more than the sum of the individual parts.

Before a teacher attempts to select and plan the use of classroom materials, he must know the goals of instruction.

IDENTIFYING LEARNING GOALS

Learning problems in the classroom are as broad as the curriculum the school offers. They may be defined in terms of the goals to be achieved. The primary teacher's goals may be to develop number readiness, greater language facility, or increased interest in reading and attainment of reading comprehension. The goal of the social studies teacher may be to impart information about other people—their cultural patterns, their home relationships—or, more important, to establish socially desirable attitudes toward other people.

The means by which teaching goals may be achieved are varied and complex. They may include reading, or actually going to live in the cultural group being studied. Between these two extremes lie the audio-visual instruction materials which, because of their interesting and flexible formats, can bring tangible, real-life information about remote cultures, peoples, places, and things right into our classrooms.

SELECTING SUITABLE TEACHING MATERIALS

After the goals of instruction have been defined, the teacher will need to arrange for learning experiences which will be useful in helping his pupils attain these goals.

Teaching materials—field trips, pictures, transcriptions, charts, books, films, slides, etc.—have unique characteristics. Hence, the selection of suitable materials should be based on how well they will help the pupils reach their goals. Fig. 16.1 summarizes the various characteristics of audio-visual teaching materials that were discussed in earlier chapters.

Other factors which must be considered in selecting instructional materials include the following:

1. Accuracy and authenticity of the information.
2. Suitability for the grade level in terms of vocabulary, pace, and general understandability.
3. Mechanical excellence of sound, vocabulary, color, and other general "see and hear" factors.

Audio-visual materials should be selected or rejected in terms of how well they perform their intended function. The answer to this question will be found in the extent to which the purpose of such materials is clearly indicated.

The following case examples demonstrate some of the ways in which well-selected and carefully used instructional materials can help in achieving good classroom learning.

CASE EXAMPLES

SECOND-GRADE SOCIAL STUDIES—ABOUT PETS

The second-grade children and their teacher stopped before one of the cages at the zoo. They watched the squirrel as it scampered around in its

	16 mm. Sound Motion-Picture Film	Filmstrip	Slides	Flat Pictures and Tackboard	Posters and Charts	Maps	Chalkboard	Field Trips	Radio	Recordings and Transcriptions	Models and Specimens
VISUAL											
Visually re-creates situations involving motion which occur anywhere	X							X			X
Visually re-creates the past	X	X	X	X	X		X				X
Visualizes theoretical ideas and microscopic life	X	X	X	X	X		X				X
Visualizes with natural color	X	X	X	X	X			X			X
Visualizes natural dimensions (three-dimensional)	X	X	X	X			X	X			X
AUDIO											
Re-creates characteristic or environmental sounds	X	X*						X	X	X	
Re-creates events through dramatization	X	X*							X		
UTILIZATION											
Sequence fixed	X	X									
Flexible organization permits rearrangement			X	X	X	X	X	X		X	X
Permits restudy	X	X	X	X	X	X	X	X		X	X
Permits leisurely examination, discussion, etc.		X	X	X	X	X	X	X		X	X
Control of time and place of use	X	X	X	X	X	X	X	X		X	X
Can usually be produced locally	X	X	X	X	X	X	X	X	X	X	X

*Sound filmstrips only

Fig. 16.1. Contributions of audio-visual instructional materials to learning.

play. Observing the children's keen interest, the teacher unsnapped the camera case and photographed the squirrel in the afternoon sunlight.

A week later she put an enlargement of the photograph on the tackboard. When she did this, the children asked many questions: Would that squirrel make a pet? Are there little squirrels? Who takes care of squirrels? Where do they sleep? Will there be other squirrels? What do squirrels eat? How old are squirrels? How can squirrels climb so well? Do they ever fall? Would they be hurt if they fell?

The camera had registered what it saw, and the children now "saw" again from the picture; but their many questions pointed to the need for more sensory experience.

A return trip to the zoo? More pictures about squirrels? A tame squirrel to live in the classroom? Books? All these were possibilities. But in this case more pictures were available.

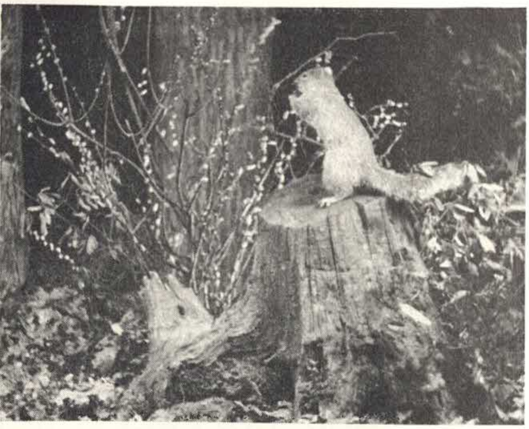

Fig. 16.2. (*Gray Squirrel,* Encyclopædia Britannica Films.)

It is story time and a filmstrip[1] is being shown. A picture of squirrels eating appears on the screen (Fig. 16.2).

"What can someone tell us about this picture?" the teacher asks.

"The squirrel is standing on his hind legs to reach some food."

"They look like pussy willows."

"They are," the teacher says. "Can you think of any other words to describe pussy willows?"

"Buds?"

"Yes. Now let's look at the next picture. What is happening?"

As other pictures are shown, the children discuss action words and the teacher writes interesting words on the chalkboard:

What squirrels eat:
  pussy-willow buds
  acorns
  nuts
What squirrels do:
  run
  jump
  build summer nests
  climb trees
  bury nuts
  drink water

The next day, at story time, the children make up an experience story. As they volunteer ideas, the teacher writes them on the chalkboard:

Mother Squirrel lives in an oak tree.
Three baby squirrels live in the nest.
The baby squirrels sleep close to mother.

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[1] *Gray Squirrel,* 73 frames, Silent, B&W, Encyclopædia Britannica Films.

There is every evidence that the children's experience story has been largely inspired by the filmstrip they saw.

The children then "write" this story on paper. Some of the children draw crayon pictures to illustrate their stories.

"How did we find out all these interesting things about squirrels?" the teacher asks.

"We saw a squirrel at the zoo."

"Yesterday we saw pictures about a mother squirrel and her babies."

"They grew up, though."

And the discussion continued. The zoo and the filmstrip were the basis for arousing interest, creating understanding, and at the same time raising questions about things not yet completely understood: How does a squirrel know how to bury a nut? What happens if it never finds the nut it has hidden? How can a squirrel remember where it has hidden the nuts?

Again the teacher guides the children in continuing their experiences of discovery and understanding. The new questions they ask are written on the chalkboard to become additional goals.

"How can we find out how baby squirrels learn to climb?" asks the teacher.

"How do they climb?" "Why don't they fall off the tree?" "Does the mother teach them?" These and other questions come from the children.

The teacher continues: "We didn't see any baby squirrels at the zoo. We didn't find out by watching the filmstrip. But if we could live right with the squirrel family from the time the babies are born . . ."

The children with their vivid imaginations voice their wishes and hopes for the make-believe idea. But one more mature child ventures that it can't be done. Thereupon the teacher explains how a motion picture was made of the squirrel family, how the camera could see inside the oak tree, how cameramen came back day after day to take moving pictures of the growing squirrels, and how today, as a result, the children can see right inside the squirrel nest and watch the babies day by day as they grow, learn to climb and hunt for food and bury acorns, and later "sniff" their way back to the buried nuts.

The children take their places to see the 16 mm. sound motion-picture film *Gray Squirrel*.[2] The film is followed by discussion of the new things the children saw.

---

[2] *Gray Squirrel,* Sound, B&W, 10 min., Encyclopædia Britannica Films.

"Baby squirrels can't leave their nest."

"Mother Squirrel has to teach the babies how to hold onto the bark."

"The nest was inside a tree."

Discussion of factual ideas was soon interrupted by an occasional critical judgment.

"I liked the film best. I could see things move," one child said.

"Sometimes it went too fast," another commented. "I like the pictures that stayed there longer."

"When can we go to the zoo again?" a third child asked.

Adults may argue the various merits of different visual instruction materials. But listening to these children's reactions to their experiences with squirrels indicates clearly that many approaches to the same learning problem must be provided if all the children are to benefit, each in terms of his individual capacity and interests.

Days later, after many experiences with squirrels, reading materials are used.

"I have a wonderful picture storybook for you today," the teacher says.

A gray squirrel book[3] is given to each child. Eagerly they open the books. Almost immediately they recognize pictures, then words that they used during story times which were put on the chalkboard, and those used in the experience stories. The teacher listens:

"Here are the pussy willows."

"The squirrel is eating the 'pussies.' "

"Who remembers what else we called pussy willows?" the teacher asks.

"Buds." This from several children.

"Who can find that word on this pussy-willow page?" (Fig. 16.3.)

The children point and make comments.

The teacher asks a child to read page 1, then asks, "What are 'tender buds'?"

"Buds that squirrels like."

"Soft, juicy, good buds," a girl volunteers.

The reading continues. Always there is evidence that past experiences offer "cues" to word meanings. Again and again it is apparent that ideas must precede word comprehension.

The children read well. Occasionally a noun is called by a synonym or

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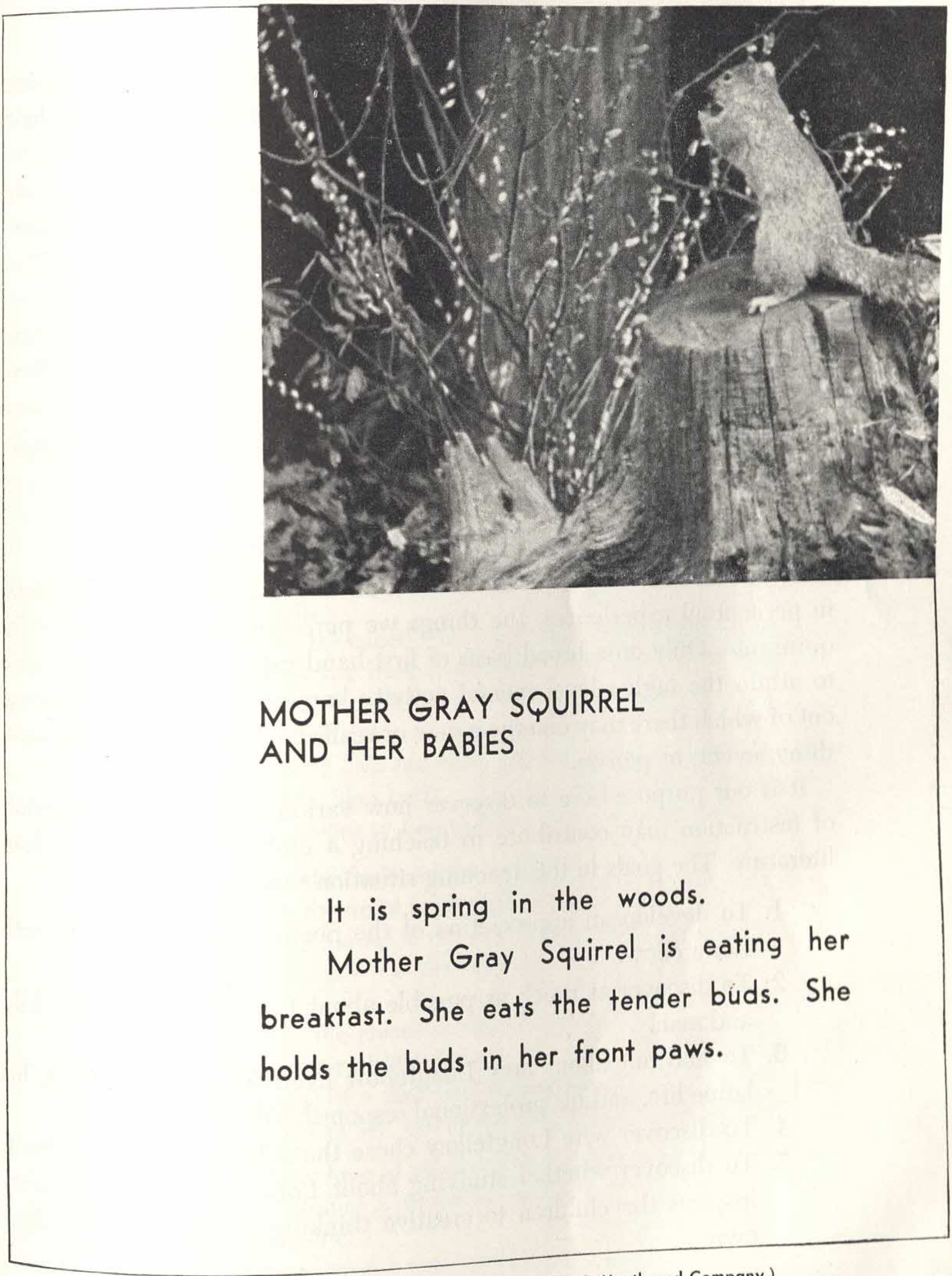
[3] Paul Witty, *Gray Squirrel* (It's Fun to Find Out Series), Heath, Boston, 1950.



MOTHER GRAY SQUIRREL AND HER BABIES

It is spring in the woods.

Mother Gray Squirrel is eating her breakfast. She eats the tender buds. She holds the buds in her front paws.

Fig. 16.3. (Courtesy of Encyclopædia Britannica Films and D. C. Heath and Company.)

a verb is replaced by a closely related action word of similar meaning. But the children help one another. They learn together just as they have experienced together.

Because they have experienced widely, they will continue to talk freely, with interest and effectiveness, they will read with increasing understanding and fluency, and they will be able to create interesting stories, drawings, poems, songs, and dramatic episodes.

As young learners, these children will develop effective and simple study and work habits. As they go on through the grades they must have the continuing advantage of a rich mosaic of learning experiences which will make learning interesting, achievement possible, and play purposeful.

INTERMEDIATE-GRADE LANGUAGE ARTS—ABOUT LONGFELLOW

As was said in Chapter 2, the basis of all understanding is to be found in perceptual experiences, the things we perceive, see, examine, or inquire into. Only on a broad basis of first-hand experiencing are we able to attain the higher-level mental activity known as reflective thinking, out of which there may emerge a new or reaffirmed attitude toward some thing, event, or person.

It is our purpose here to discover how various audio-visual materials of instruction may contribute in teaching a unit of work in American literature. The goals in this teaching situation were as follows:

1. To develop an appreciation of the poems of Henry Wadsworth Longfellow.
2. To discover as much as possible about Longfellow as both child and man.
3. To find out about how Longfellow lived—his surroundings, his home life, and his professional responsibilities.
4. To discover why Longfellow chose the subjects he wrote about.
5. To discover whether studying about Longfellow and his poetry inspires the children to creative thinking or expression of their own.

Twenty-six sixth-grade children undertook this assignment. They varied in age from ten years six months to thirteen years one month. Discussion revealed that they had less-than-average interest in poetry as such.

The classroom had adequate chalkboard and tackboard space. Half of the tackboard contained pictures about Longfellow and his home and neighborhood. There was a political map of the United States. The classroom bookshelf held an encyclopedia and dictionaries, and volumes of Longfellow's poetry on loan from the main library. A record player was set up in readiness to play back recordings of his poetry, and there were projectors for showing filmstrips and films about him.

The following is an actual transcript of conversation between teacher and pupils:

TEACHER. Do you have some favorite poems? (*Pause.*) Poems that you like to read?

GARY. I don't read many poems.

TIMOTHY. I can remember some poems, but I can't think of their names.

BILL. I know that there's one about going fishing, but I can't think of the name either.

MARY. One about daffodils.

TEACHER. I think I know. It's called "To a Daffodil." How many of you have read that? (*Several hands are shown; not much enthusiasm is evident.*)

GRETCHEN. I think that was Longfellow.

TEACHER. That's right. "The Children's Hour" is also one of my favorites. Who has another favorite poem? (*No response, general apathy.*) Would you like to hear the poem Gretchen likes best? (*Teacher walks over to the bookshelf, picks up one of the collections of Longfellow's poem, finds place and reads*)

"Between the dark and the daylight
  When the night is beginning to lower,
Comes the pause in the day's occupations,
  That is known as the Children's Hour.

I hear in the chamber above me
  The patter of little feet,
The sound of a door that is opened,
  And voices soft and sweet." (*Teacher stops reading.*)

Can any of you guess anything at all about the man who wrote that poem? Can you imagine what kind of a person he was?

JIMMY. It was by Longfellow.

TEACHER. Yes. Does the poem tell you even one thing about him?

EVELYN. He liked children.

GRETCHEN. Well, the poem is about children; he must have liked children.

TEACHER. Was this one of the ways then that Longfellow took to tell us that he liked children? (*Pupils nod assent.*) He let us know how he felt by writing a poem, didn't he? When you feel some way about something, when you have an idea, how do you tell other people about it?

LARRY. Well, I don't write a poem about it.

ELLEN. I just talk natural.

TEACHER. How else can we tell people what we think about things?

JEAN. I sometimes like to draw pictures about things I like.

HILDEGARD. I could write a letter about it.

HELEN. I sometimes write about interesting things in letters, but I do it just as if I was talking. I write to my cousin that way sometimes.

TEACHER. That's right. We can talk about our ideas, we can write them just as we talk or might even want to draw pictures about them. I can think of other ways, too.

LEE ANN. I tell how people feel by the way they act.

TEACHER. Yes, we often show how we feel. How could we tell each other about a poem by using just actions?

LEE ANN. Why, I guess we could act it out.

GRETCHEN. I'd like to do that.

TEACHER. And I believe we could. Now let's get back to talking about Mr. Longfellow. Here's another poem I think will interest you. You boys will like this one, "Paul Revere's Ride."

JIMMY. Oh, I've heard about that one.

PAUL. I've read that one too.

MARY. Oh, that's a good one.

TEACHER (*reads*)

"Listen my children, and you shall hear
Of the midnight ride of Paul Revere,
On the eighteenth of April, in Seventy-five;
Hardly a man is now alive
Who remembers that famous day and year.
He said to his friend, 'If the British march
By land or sea from the town to-night,
Hang a lantern aloft in the belfry arch
Of the North Church tower as a signal
  light,—
One, if by land, and two, if by sea' ";

(*Teacher stops reading and asks*) Does that give you any more ideas about this man, Longfellow?

SAM. Well, he was interested in Paul Revere.

MARY. He was interested in the war. He wanted to tell us about it.

TEACHER. What war was that?

MARK. The war of '75.

TEACHER. What century '75?

MARK. 1875?

TOM. 1775.

MARY. Well, it couldn't have been 1975.

TEACHER. We've got it down to within one century, haven't we?

MARK. What year was it?

TEACHER. I'm not going to tell you. I'm going to ask you to find out.

MARK. Oh, I'll find out all right.

TEACHER. How?

MARK. May I go over to the encyclopedia and look up "Paul Revere"?

TEACHER. Sure, go to it.[4] Would you like to hear the rest of the poem, "Paul Revere"? (*The hands of most of the children appear.*) How many of you would like to read the poem? (*Most of the hands appear.*) I'll just return this book to our bookshelf, and if you wish to, you may find it there. (*Replaces book on shelf, first inserting an obvious place mark which children note. Teacher picks up another volume.*) Here is another interesting poem which Longfellow wrote. It's called "Hiawatha." What do you suppose it is about? (*Many hands appear.*)

ETHEL. Must be about Indians. (*The children nod assent.*)

TEACHER (*begins to read*)

> "By the shores of Gitche Gumee,
> By the shining Big-Sea-Water,
> Stood the wigwam of Nokomis,
> Daughter of the Moon, Nokomis.
> Dark behind it rose the forest,
> Rose the black and gloomy pine-trees,
> Rose the firs with cones upon them"; (*Teacher stops reading*)

LEE ANN. Let's hear some more.

TEACHER. No, first let's describe this place.

GUNTHER. Well, it's on a shore.

BILL. And there're pine trees there.

TOM. And fir trees, too.

LEE ANN. And it's gloomy, don't forget. Sounds like something's going to happen.

TEACHER. How many of you have been to a place something like that? (*Most hands are raised.*) Would you like to hear me read some more, then? (*Most hands are raised and heads nod.*) Well, I'm not going to. I'm going to put this book right back here with the rest and if you'd like to read it, you may.

Let's talk some more about this man. Aren't you getting a little curious about him? (*The pupils nod assent.*) What are you beginning to get curious about?

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[4] Notice how the children are completely at a loss in identifying events of the past, even though in their social studies they have been studying stories of the Revolution. The concept of time past is very difficult, and it is only by associating events with people that we can attach reasonableness to the concepts which past times and dates imply.

LEE ANN. I'd like to know about some more of the poems he wrote.

GRETCHEN. I'd like to know what kind of a little boy he was when he went to school.

LARRY. I'd like to find out about that, too.

JERRY. What made him start writing poems?

DANNY. I know how he started writing poems. When he was little he went to school and the teacher told him to write a poem. Longfellow didn't know what to write about so he went outside and looked around and he saw some things and started writing about them.

TEACHER. That *might* have been the way it happened, Danny. I wonder how we can find out whether that really happened that way or not.

DANNY. Well, we could read up about Longfellow. Maybe that will tell us.

TEACHER. Let's get some of our ideas down in writing. (*Turns to chalkboard and starts writing.*) (1) Larry wants to know why Longfellow wrote poems. (2) Gretchen wants to know about Longfellow's childhood. (3) Jerry said, "What are some other good poems that we can read?" (*Discussion continues; teacher writes down additional points.*)[5] Look at this list of things you are interested in finding out about. (*Pause.*) What can we do to find out the answers? Where can we look for information? (*Long pause.*)

DRUCILA. We can "look up" about him.

TEACHER. How can you go about that?

DRUCILA. In the encyclopedia?

LEE ANN. I think our librarian would help me find some books about it.

TEACHER. Where else can we go to look up information?

JEAN. To the dictionary.

LARRY. You wouldn't find much there. It doesn't say much.

MORGAN. Aren't there some books in the library that tell about the life of Longfellow? (*Classmates express agreement.*)

TEACHER. What we've all thought about so far means that we can find out more information about Longfellow through reading, through words. But tell me, how are we going to know what all these words mean? What other way do we have to find out about Longfellow other than going to books?

LEE ANN. We can read more of his poems.

TEACHER. But that's more about words, isn't it? If you could do anything you wanted to do to find out about Longfellow—now remember what I said—anything at all, what would you like to do to find out more about this man?

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[5] At this point interest seems to be stimulated in the children. They have become motivated, fascinated with the possibilities of knowing more about Longfellow. While no teacher can motivate a child, it is the teacher's responsibility to put opportunities and experiences in the child's path so that on encountering them he will become interested and be motivated to investigate and thereby increase his information.

(*Long pause.*) You may even imagine that you are magical. Think of any way you wish to find out more about this man.

Tom. Well, if we were magic we could have Longfellow come to life again. We could ask him to come right here and talk to us.

Teacher. What else might we do?

Betty. Anything at all?

Teacher. Yes.

Betty. Why, I'd like to make-believe I could go and visit him right in his home.

Bill. Sure, if we could go and visit him, we could ask him all our questions. Maybe he could even read to us.[6]

Teacher. Yes, if I could do anything I wanted to, I'd either ask Longfellow to come here or I'd see if we couldn't go visit with him.

Larry. Aw, but he lived a long time ago. We can't do that.

Teacher. No, Larry's right, there isn't much we can do about that today. Or I wonder if there is? (*Long pause.*) What's the nearest thing we can do today right in our classroom, the nearest thing to going to see Longfellow or the nearest thing to bringing him right here in our classroom? Who's got an idea? (*Long pause.*)

Jean. Oh, you mean the television play?

Teacher. No, we couldn't do that here. We don't have a set yet.

Morgan. Maybe a radio program.

Teacher. Yes, and it's my job to know if there have been any radio programs, isn't it?

Tom. You're thinking of a movie, I bet.

Teacher. That's it. When I knew we were going to begin studying about Longfellow, I went to our librarian and she helped me pick out all those books. See them over there on that shelf? (*Pupils look over toward shelf and nod.*) I also discovered, when I had a talk with our audio-visual supervisor, that there are some films which have been made on the subject of Longfellow. Well, I've previewed them and I've selected one which is called *Henry Wadsworth Longfellow*. I wonder if some of the answers to our questions aren't in that film? (*Pupils nod eagerly.*) So now, boys and girls, we're going to do just what you said you'd like to if you could. We're going back to "visit" Longfellow (by seeing the film). That was Tom's suggestion, wasn't it? (*Children nod.*)

There's one thing we should do first. Yesterday afternoon I thought I had better look at this film to see what it was about, and as I looked at it, I discovered that it was very interesting. But there were a few words in the film that I'm not sure that I knew. (*Teacher turns to chalkboard and writes.*)

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[6] The children have expressed their natural eagerness to observe at first-hand, to engage in realistic methods of inquiring. They have revealed their own desire for learning through first-hand experiences.

"Brawny arms," "chestnut," "village smithy," "reading at law," "Portland, Maine."

How many of you know all of these words? (*One hand appears.*) All right, Gary, tell us what the first one means . . .

GARY (*pronouncing it slowly*). "Brawny." I know how to pronounce it.

TEACHER. But does that mean that you know its meaning?

GARY. I guess not.

TEACHER. Well, what do you think we ought to do about that?

GARY. Well, look them up, I guess.

TEACHER. Well, Gary, do you think you really should look them up?

GARY. I don't know.

TEACHER. Will it make any difference if we know the meanings of these words? Will it make any difference whether or not we can understand this film? (*Pause; pupils obviously don't see any reason for knowing the words.*)

Let me ask you a question. When we do some regular reading in our geography book or our nature study book, what do you do sometimes when you run across a word you don't know the meaning of?

LARRY. I skip them. (*Class laughs.*)

TEACHER. Well, what's going to happen to your reading, Larry, if you keep on skipping the words you don't know?

LARRY. I guess it won't be so good.

TEACHER. Well, what do you think we should do?

LEE ANN. Well, we ought to look them up so we know what we're reading about.

TEACHER. And where will we look them up?

LEE ANN. In the dictionary.

TEACHER. All right, let's look up some of these words. Let's look up "brawny." Let's look up "chestnut." Let's find out about Portland. (*Children look up words and word study continues. Next they review their own questions about Longfellow and then see the 16 mm. film,* Longfellow,[7] *in their classroom. After it ends, the discussion continues.*)

TEACHER. Have you found the answer to any of our questions? (*Teacher refers to the chalkboard list of things to which the children were interested in finding answers.*)

JACK. I heard a new poem that I didn't know he had written.

TEACHER. What was it called?

LEE ANN. I think it was "The Arrow and the Song."

JACK. That's right. That's a nice one. I can understand that.

TEACHER. What was it about?

JACK. It was about friendship and being decent to people.

TEACHER. Does that help us to understand Longfellow?

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[7] Sound, B&W, 16 min., Encyclopædia Britannica Films.

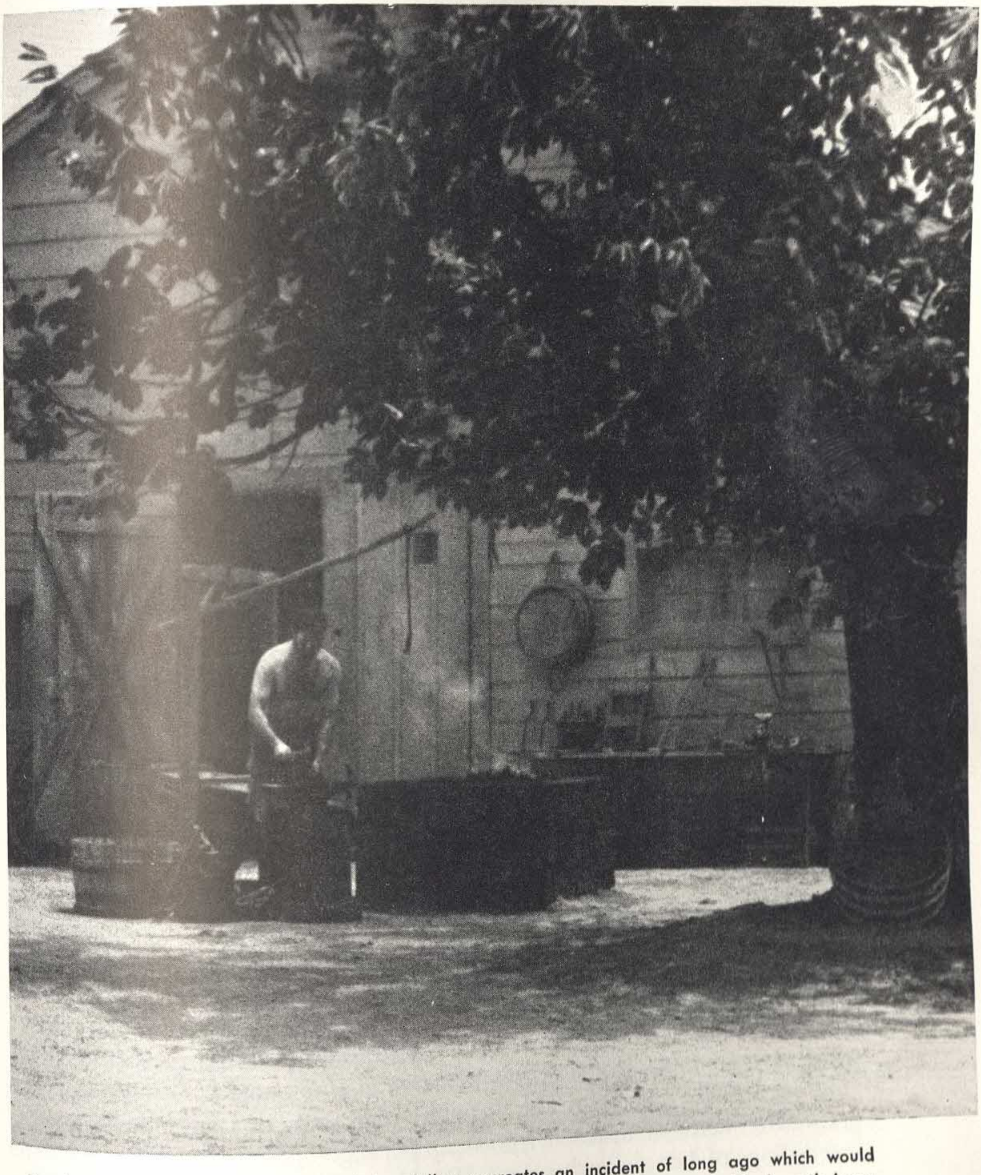

Fig. 16.4. The film *Henry Wadsworth Longfellow* re-creates an incident of long ago which would otherwise be denied today's learners. (From the Encyclopædia Britannica Film, *Henry Wadsworth Longfellow.*)

MARY. Yes, it tells us that he was a friendly man. He liked people.

TEACHER. You'll find that poem in our collection of books over here on our room bookshelf.

Did the film tell us very much else about his childhood?

GARY. Not much.

Teacher. Have we a right to expect that all the answers to our questions would be found in this one film?

Gary. No, I guess not. Guess we'll have to find it somewhere else.

Teacher (*holding up filmstrip*). I wonder if there is some information about Longfellow's childhood in this filmstrip.[8] Who would like to take this over to the projector (that is, during our next study period) and look through it and see whether he can find additional information? (*Many hands are raised.*) All right, Gary, would you operate the machine? (*Gary nods assent.*) Who would like to work with Gary? (*Hands appear; a committee of five children is named to work with Gary.*)

One of the things we wanted to do was find more poems by Longfellow. Let's make a list of the poems we now know.

Mary. "The Arrow and the Song."

Gary. "Paul Revere."

Jean. "The Children's Hour." (*Continued discussion, and teacher lists titles on chalkboard.*)

Teacher. We have talked about nine poems. We've heard several of them mentioned in the film, have we not? But certainly he wrote more! Who was it who was interested in finding out more about the poems which Longfellow wrote? (*Hands appear.*)

Gertrude. I was.

Teacher. Where can we find more of them?

Gertrude. I guess in that shelf of books over there.

Lee Ann. I'm sure I saw a book about Longfellow's poems at home.

Teacher. What idea does that give you?

Lee Ann. I could bring the book.

Jerry. If Lee Ann finds some interesting poems, she might bring them in and read them to us.

Teacher. How about that, Lee Ann?

Lee Ann. I'd like to.

Teacher. Who would like to work with Lee Ann on such a project? (*Hands appear; a committee of two boys and two girls is named.*) Would you like to hear a really "expert" reader of poetry read some of Longfellow's poems? (*Children nod assent; teacher picks up package of records.*) Here are some recordings of Longfellow's poems. Would you like to hear them? (*Children agree that they would.*) I'm going to turn these over to Lee Ann and her committee. During our study period her committee can listen to these and pick out the ones they think are the best and then present them to us tomorrow or the next day. Would you like that? (*Enthusiastic response.*)

At the beginning of the hour one of you suggested that when you want to tell someone else about something you're interested in, you'd like to draw pictures. Who was that? (*Two hands appear.*) All right, Jean. Look around; do you see the tackboard over there? I've put up several pictures about Longfellow, but I've not used even half of the tackboard. Do any of you have any ideas about what we might do with the rest of that board?

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[8] *Longfellow*, 25 frames, Color, Curriculum Films, Inc. Presents significant influences in the author's life and shows the America in which he lived and for which he wrote.

JEAN. Oh, yes, I think we can find more pictures.

TEACHER. It's a hard job to find pictures already made. I had quite a job finding these five. You can try if you like. What else might you do?

LARRY. I think we could draw some.

JEAN. After Lee Ann finds some poems I think I could draw some pictures that will illustrate them.

TEACHER. Is there anyone else who would like to work with Jean? (*Several hands appear; a committee of five children is named.*) The next time we go to the art room and the teacher allows us to decide on our own project, do you think you'll have an idea? (*Nods of assent.*) If we have some ideas about Longfellow or ideas about other things now that we're studying Longfellow, what else can we do?

MORGAN. Write a poem?

TEACHER. Write a poem? I wonder if we know how? Would some of you like to try? (*Several hands appear.*) Larry, would you like to write a poem?

LARRY. No.

TEACHER. Well, Larry, you haven't suggested anything that you would like to do so far. Would you like to work with any of these other committees that have been established?

LARRY. No.

TEACHER. Well, Larry, I'd like *you* to decide what you'd like to do, but sooner or later we'll have to come to a decision, and I'd like the idea to come from you. Either you come up with an idea or I will.

LARRY. (*Expresses understanding.*)

TIMOTHY. I've got an idea. I think we could act out that part where Longfellow decides to take a try at writing this poem this other fellow suggested he write.

TEACHER. Who remembers the name of that? (*Several voices.*) Who would like to try being Longfellow, or being Hawthorne? (*Several hands are raised.*) That's fine. Larry, how would you?

LARRY (*shuffles uncomfortably*). I'd rather not; I'll think of something.

TEACHER. Here's something here which I believe will help those who would like to try writing a poem. (*Teacher holds up collection of poems written by fifth- and sixth-grade children; several are read and the book is turned over to the committee. Larry raises his hand.*)

TEACHER. Larry?

LARRY. I think I could draw a picture about that Hiawatha poem.

TEACHER. Good! We'll give you permission to join the bulletin board committee. How would you like that?

LARRY. Sounds O.K. Can I show you the parts I mean?

TEACHER. In just a moment, Larry, I'm glad you volunteered. (*Teacher looks up at the clock.*) Since we have only a few minutes left in this period, let's see what we've decided to do now. Now each of us has his job to do. When we come back from recess, we'll break up into our committee groups. I'll go from one group to the other to see how you're coming along. Does everybody know what we're going to do when we come back in now? Fine. (*Class dismissed.*)

Implications

The outside reading habits of this group of children were examined, and it was found that most of the children read what the librarian called more than the average number of books. Why weren't the children enthusiastic or at least mildly interested in Longfellow and his poems at the beginning of the new unit of work?

Someone has said that it is difficult to be interested in things we do not know about. This certainly applies to the appreciation of poetry. These children had little or no reason for being interested in poetry. They had read very few poems and had heard very few poems read. They knew little or nothing about the man who wrote them. Gradually, however, as references were made to the tackboard, filmstrip, transcription, and the sound motion-picture film, growing interest began to be apparent in the reactions of some of them. The children began to see reasons for being interested. They began to feel some degree of motivation. Furthermore, the room was so arranged that it presented many opportunities for getting information and ideas about Longfellow and his poems. Consequently most of the children became increasingly interested in learning more about not only the man but his poetry.

Language activities chosen by the children included creative dramatics, poetry writing, search for additional poems, and preparation of readings for class enjoyment. To this might well be added choral reading, for some of Longfellow's poems offer an ideal opportunity for chorus parts to be read by a group of students, the solo or refrain lines being read by individuals. This type of work is valuable because it permits the children to participate in a very satisfying activity—speaking in unison and ultimately assuming individual responsibility for solo lines.

Use of the map became necessary as soon as the children discovered that there was more than one Portland in the United States. From the follow-up discussion the children learned that it was Portland, Maine, which was referred to in the film. They then associated this Portland with its location on the map and with the man who lived there. This gave some of the children a feeling of closer kinship with Longfellow and his writings. Projection materials of the unit included the motion-picture film and the filmstrip, both on the poet. The film permitted rather complete identification with him—his manner of speaking, his movements, his thinking as expressed through his speech, and his attitudes toward his associates and toward children—and thus made indelible impressions in the minds of the viewers. The motion-picture presentation allowed the children really to live selected experiences with the poet and enabled them to feel that they had actually known him.

The filmstrip, which was used by a smaller group of interested pupils, helped them to review key situations shown in the film. They could discuss at leisure and examine individual frames of the filmstrip as long as they felt a need to do so.

The recordings and transcriptions brought to the children accomplished readers interpreting selected poems by Longfellow. The children heard other interpretations, for the teacher read some poems and the children themselves read the same ones or others. The transcriptions served as still other models to reveal the many inflections and interpretations which can be given a poem.

A JUNIOR-HIGH CITIZENSHIP CLUB—ABOUT THE OTHER FELLOW

In this modern world there is every reason for schools to become increasingly concerned with their responsibility for teaching subject matter. Whether in science, social studies, or language arts, there is more and more to learn. Frontiers have all but disappeared, and there is more geography to learn. Communication has become instantaneous, and rapid transportation makes everyone a potential citizen of the world.

The circumstances have joined in placing a heavy responsibility on the schools. Today more courses are offered, compulsory school attendance is being extended, more and thicker textbooks are used, and new audio-visual materials are created almost daily. We are surrounded by evidence of the schools' great concern to help students know something and to use what they know.

But what about the ability to use all this information in a socially desirable way? A person may be well tutored and at the same time be lacking in social understandings which enable him to help himself, his family, his friends, and his community live in happiness and peace.

All school staffs must be concerned with their responsibility for helping to guide children toward socially acceptable behavior in the classroom, on the playgrounds, and in the community. The following case example concerns materials and techniques which can help children to attain better understanding of their peers and hence pleasant, wholesome, and helpful social relationships with them.

Among the bigger boys in the seventh grade there was one in particular who was far beyond the others in physical development. He was a good student as well. Unfortunately, he often took advantage of his size in a way that made some of his classmates very unhappy.

"I don't know how Frank can be so inconsiderate," said a teacher. "Why, on the playground he feels he must be first, have the longest time at bat, stay on the giant ladder longer than anyone else . . ."

The principal listened.

"Several of the children asked if they could stay inside during recess today. Then I realized that I had to do something. I've tried making Frank stay in."

The principal picked up the conversation.

"Some children just naturally fall into teasing, bullying habits. And unless we do something about it, the habit may become fixed for life. We have to help the children learn how to deal with teasers, and Frank should have a chance to see himself. I've spoken to Frank about his behavior, and I suggest the whole class do some role playing."

The next morning the seventh-graders were discussing stories they had written on "How to Have Fun on Our Playground."

Jean reads: "The giant ladder is lots of fun. There is room for six or seven children on it. Sometimes one boy will get on it and keep everyone else off . . ."

Betsy reads: "The softball games are wonderful. Sometimes we have to stop because somebody won't give up his turn at bat, and we can't make him because he's too big."

The other children read their stories. They tell about interesting games and the fun they have on the equipment; most of them refer to Frank's teasing ways. Frank grins and enjoys it.

The teacher interrupts. "These are fine stories. Some of the ideas are so good that I suggest we act out one or two of them."

The children discuss the stories and decide on the softball incident.

TEACHER. Who will be the catcher? (*Children volunteer.*) The pitcher? The batter? (*Others volunteer.*) Come up here (*indicating space at front of classroom*). Each of you talk and act just as if you were on the playground. Forget you are here in class. Say and do just what you think the batter, catcher, and pitcher would. (*The children talk over ideas and take their places.*)

CATCHER (*pantomimes cue to pitcher*). Right here, Chuck?

PITCHER (*pantomimes pitch and the batter swings. The role playing continues.*)

CATCHER. That's three strikes and you're out!

BATTER. Aw, just one more.

CATCHER. That was *three;* you're out!

BATTER. *I want one more.* (*Batter stands firm.*)

The children in their seats talk first among themselves, then support the growing argument carried on by the role players. Frank grins but says nothing.

The teacher intercedes and thanks the children, who return to their seats. Other playground incidents are treated in this way—fair play in choosing teams, taking regular turns at the swings, and settling a dispute about base running.

At noontime the teacher talks to Frank about his behavior, complimenting him on the good grades he receives and on his fine bodily coördination and growth. She suggests that he is using his strength and intelligence in unsportsmanlike ways, and she attempts to show him why he is not liked by his classmates.

The teacher can help guide and control the situation at school, but reports soon come in from some of Betsy's friends that Frank is plaguing her with nasty remarks and never-ending taunts about tattling. Apparently Frank considers that the story Betsy wrote is the reason for the embarrassing role playing and the teacher's remarks about sportsmanship.

The teacher, realizing that Frank's behavior off the school grounds is less easy to guide, has another helpful conference with the principal.

They agree that there *are* teasers and probably always will be, that teasers in school may become disturbing elements as adults, and that the school has a responsibility to guide children in situations involving teasing.

A search for methods and materials reveals a 16 mm. film about teasing which might be helpful. The film, *The Other Fellow's Feelings,*[9] is scheduled to be shown several days later. It portrays a classroom situation in which a boy teases a girl beyond endurance. It poses the question of how such a situation should be handled and suggests several possible ways but leaves the actual decision to group discussion following the film.

TEACHER. We're going to continue our stories about citizenship at school and at home. Instead of listening to stories which we have written or reading stories in our books, we will see a film today about pleasant and happy living in school. As you watch it, will you think about things such as these:
  a. Do you ever act like the boys and girls you see and hear?
  b. If you were Judy, what would you do?
  c. If you were one of Judy's friends, what would you like to do?

As the children see the closing scenes of the film, additional questions are asked by the narrator:

Should Judy have gone to her teacher to ask for help?
Should Judy try to retaliate?
Should Judy just ignore the situation?
Should Judy go to her parents for help?

The teacher's questions and those asked by the film narrator give the seventh-graders many ideas:

PUPIL. I'd just tell Jack what I thought about teasing. I think he'd stop if he knew I didn't like it.

PUPIL. If I were Judy, I'd get a bottle of perfume and break it over his head. Why he's so mean . . .

PUPIL. I'd go tell my big sister. She would tell Jack a thing or two.

The discussion continues. Finally the teacher asks if anyone would like to act out one of the ideas expressed. Several children volunteer.

TEACHER. Alice, will you be Judy? Bill, you try being Jack. (*Bill and Alice talk quietly about their plans.*)

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[9] Sound, B&W, 10 min., Young America Films.

ALICE (*to teacher*). We both need friends. (*Friends are chosen and the action begins. Alice and her friend walk slowly across room. Bill and his friend follow.*)

JACK. Judy uses the smelliest perfume. (*Judy evidences discomfort but continues walking. Jack begins calling Judy names.*)

JACK. Judy's a smelly; Judy's a stinky. (*Judy ignores it.*)

JUDY'S FRIEND. Jack is just terrible. I think you should tell your mother.

JUDY. I'm just going to ignore Jack. (*Jack continues following and calling names.*)

JUDY'S FRIEND. Jack has been doing this for days, Judy.

JUDY. I'm not going to be a tattletale. I'm just going to ignore Jack. (*They continue walking. Jack picks up imaginary pebble and throws it at Judy. He continues teasing.*)

JUDY'S FRIEND. Judy, Jack will never stop. Let's go and tell your mother.

JUDY. No, I won't do that.

JUDY'S FRIEND. Then let's ask our teacher to help.

JUDY. No.

JUDY'S FRIEND. If you don't, Jack will keep right on teasing you.

The girls end the action by ignoring Jack and return to their seats.

"Do you think Judy is right in ignoring Jack?" the teacher asks.

The children discuss the "play" situation. Some agree that she is right; others suggest that there is a limit to teasing and that good sportsmanship is a two-way responsibility. Most agree that they want to settle their own problems if they can.

"Does anyone else have a different idea about Judy and Jack?" This question from the teacher brings forth other possible solutions which are role played:

1. Judy retaliates by calling Jack as many names as Jack called her.
2. Judy's friends accuse Jack of poor sportsmanship.
3. Judy's friends retaliate by messing up Jack's desk in his absence and leaving an explanatory note.
4. Judy asks the teacher for help.
5. The Citizenship Club elects two boys and two girls to a committee on sportsmanship.

In acting out this idea, Jack stands before the committee:

CHAIRMAN. Jack, you've been teasing Judy about that perfume.

JACK. Aw, I was just having fun.

COMMITTEE GIRL. It isn't fun when you do it all week.

Jack. Well, Judy shouldn't bring smelly perfume to school.

Chairman. We all know you're jealous of Judy because she won that essay contest, and you didn't. (*Jack says nothing.*) We've decided that if you're going to be a poor sport and keep on calling Judy names, we won't let you play ball with us during recess.

When these children return to their seats, the class discusses forming a sportsmanship committee in their own room. Frank sits quietly. He no longer grins.

Implications

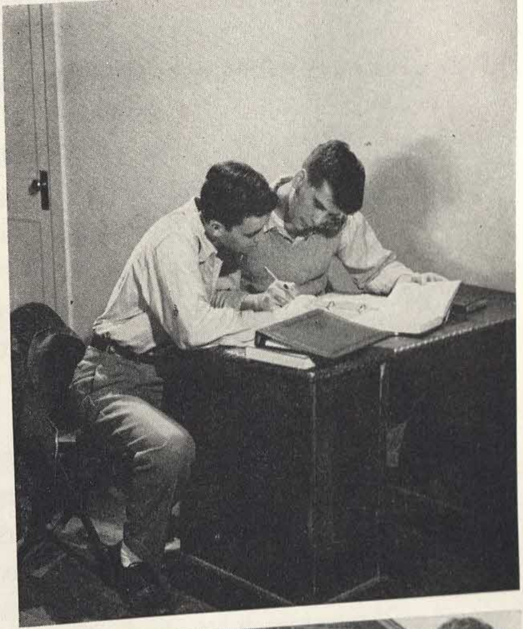
As the sound film says at the end, "There will always be teasers"—in school, in the neighborhood, in adult organizations, and in business. When an individual uses his strength to harm others, he may be called a bully. Bullies may constitute unsocial, subversive groups; and subversive groups may foment grave social conflict, and even war.

If the people who teach in our schools will more completely accept responsibility for guiding youth toward right social thinking and action, possibly we can achieve the seemingly unattainable peaceful adult relationships we all know can and should exist.

Human relationships cannot be taught from a textbook. They must be lived. Acceptable social relationships must be experienced. Certainly no subject discussion is so important that it should not be interrupted when circumstances arise in which a teacher-pupil group can discuss and think through the right and wrong of a social situation that affects the well-being of the group.

Group discussion is useful in examining the unsportsmanlike or cruel actions of an individual pupil. Dramatic play is a fascinating and realistic way of reconstructing circumstances. Role playing allows a situation to be objectively examined because not only can the situation itself be enacted but the feelings and reactions of many persons can be revealed when one situation is enacted many times, each time with a new "cast." Through role playing a child can reveal himself, both to himself and to others.

Good teaching materials on social behavior are available. In addition to stories about sportsmanship, citizenship, and group living, many fine 16 mm. sound motion-picture films are available, such as the following (Fig. 16.5): *Act Your Age* (Sound, B&W, 13 min., Coronet Instructional



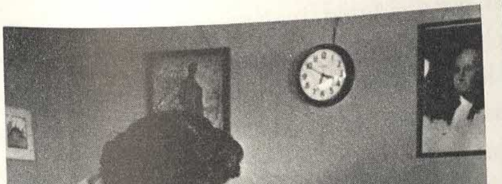


Fig. 16.5. (*Top:* From *Developing Friendships,* courtesy of Coronet Instructional Films. *Bottom, left:* from *The Other Fellow's Feelings,* courtesy of Young America Films, Inc.; *right:* from *Developing Responsibility,* courtesy of Coronet Instructional Films.)

Films), *Developing Friendships* (Sound, B&W, 11 min., Coronet Instructional Films), *Developing Responsibility* (Sound, B&W, 10 min., Coronet Instructional Films), *Glen Wakes Up* (Sound, B&W, 10 min., Young America Films), *Social Courtesy* (Sound, B&W, 10 min., Coronet Instructional Films), *The Other Fellow's Feelings* (Sound, B&W, 10 min., Young America Films), and *You and Your Friends* (Sound, B&W, 8 min., Look Magazine). Films such as these can inspire worth-while discussion and dramatic play.

If schools today are truly attuned to their social responsibilities, they will make provision for discussing the possibility of attaining higher levels of socially valuable living.

HIGH-SCHOOL MODERN LANGUAGES—ABOUT FRENCH

Foreign-language instruction should receive increased emphasis in our schools as the need for better understanding of our neighbors throughout the world becomes more widely recognized. This need is well phrased in a Wisconsin curriculum bulletin:

"Americans have always been handicapped in their international relationships not only by their lack of linguistic training but also by their lack of contact with any way of life different from their own. This gap in their education has resulted in an immaturity in point of view that is incompatible with the world leadership that the United States is now called on to assume."[10]

Function of Modern-Language Teaching

Knowledge of a foreign language as an isolated academic skill clearly has little to offer toward a better understanding of the world we live in. Modern-language teachers recognize their function as one of developing an understanding and appreciation of other peoples through their language. Such knowledge is best acquired by living in a foreign land and learning the language, customs, problems, and viewpoints at first-hand.

Another means of acquiring this understanding is to visit the country vicariously by such means as literature, pictures, films, and records—in short, to see and hear the people as they are at home. In either case, a working knowledge of the language will contribute a great deal to the realism and value of the experience.

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[10] Wisconsin State Department of Public Instruction, Coöperative Educational Planning Program, *Modern Languages in a Modern Curriculum*, Curriculum Bulletin No. 23, 1950, p. 8.

"Economic facts, past events, the study of governmental systems add to one's stock of information, but they leave the soul cold," says Professor Mario Pei of Columbia University. "They do not have the glow that comes from understanding the other fellow's utterances, the joy of direct communication, the realization that the foreigner is, after all, a fellow human being, and that, once we have pierced through the thin veil of linguistic differences, we shall be able to get along with him."[11]

The Learning Problem

Modern-language instruction has two aspects, the linguistic and the cultural. The linguistic or technical aspect includes aural comprehension, oral facility, reading power, and ability to write the language. The cultural side is concerned with providing useful and stimulating information about the history, geography, art, music, economy, living standards, and traditions of the country. Such knowledge makes possible the building of desirable attitudes such as sympathetic understanding and appreciation.[12]

These two aspects are not only interrelated but also integral parts of the same process. Both are taught as natural parts of the whole experience. Grammar may be emphasized today, culture tomorrow; but in the long run a language is best learned in a framework of experiences which make the people who speak it come alive.

The teacher of a high-school French class, for example, arranged to have a French chef from a local hotel visit the class one day. The chef could speak virtually no English, and the pupils were taking first-year French; consequently the teacher had to help a little. She reported the pupils' amazement and delight when they discovered that they could actually converse in French with a real live Frenchman. Such experiences can have immeasurable value in adding zest and purpose to the learning of a foreign language.

As in any other subject, interest and learning go hand in hand in a modern-language class. How do you arouse and maintain interest in language study? Perhaps we can get some useful ideas by looking in on a class whose teacher, Professor Laura Johnson of the Wisconsin High School at the University of Wisconsin, has had marked success in imbuing her pupils with genuine interest in and enthusiasm for modern-language study.

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[11] Mario A. Pei, "Our Job as Language Teachers," *School and Society*, November 9, 1946, p. 322.

[12] Laura B. Johnson, "Use of Audio-Visual Aids in Foreign Language Teaching," *Modern Language Journal*, November, 1946, p. 404.

The unit on French Canada on which the class is working comes near the beginning of the second semester of high-school French. When the class begins, Miss Johnson directs the pupils' attention to a map in the front of the textbook.

"Some of you may wonder at times why we should study French. One reason is suggested on this map. What do you notice there? James?"

"There are quite a few American cities with French names like Detroit, St. Louis, Joliet and Racine."

"Fine. What else do you notice? Elaine?"

"There seem to be more French names in Wisconsin than in other states."

"Yes. As a matter of fact there are many cities and towns in Wisconsin with French names. This map shows only a few. Can you think of others? Will you write them on the board, Doris? We'll help you with the spelling."

A list of a dozen communities is written quickly on the board. As ideas begin to dwindle, Miss Johnson asks who would like to study a map of Wisconsin and make up a more complete list. Several boys like the idea and promise to report the next day.

"Now does this raise any questions in your minds? Janet?"

"Well, I think it might be rather interesting to know how some of these places got their names—like Eau Claire and Fond du Lac for instance. You're used to hearing these names and don't really think much about them. At least I never have before."

"It makes me wonder why we have so many French names in Wisconsin," added Bob. "I know we have a lot of Germans around Milwaukee, Norwegians around Stoughton and Swiss people over around Monroe, but I've never heard of any large number of French people here in the state."

With such leads as these, the lesson on Les Français en Amérique gets under way. For several days the class reads and talks about early French explorers like Cartier and Champlain, Marquette and Joliet, and La Salle and Tonty. The textbook discussion of these explorers is in the form of interesting conversational stories which involve both geography and history and likewise provide the material for work on pronunciation, usage, and grammar.[13] An old map of the explorers' routes, a song, and

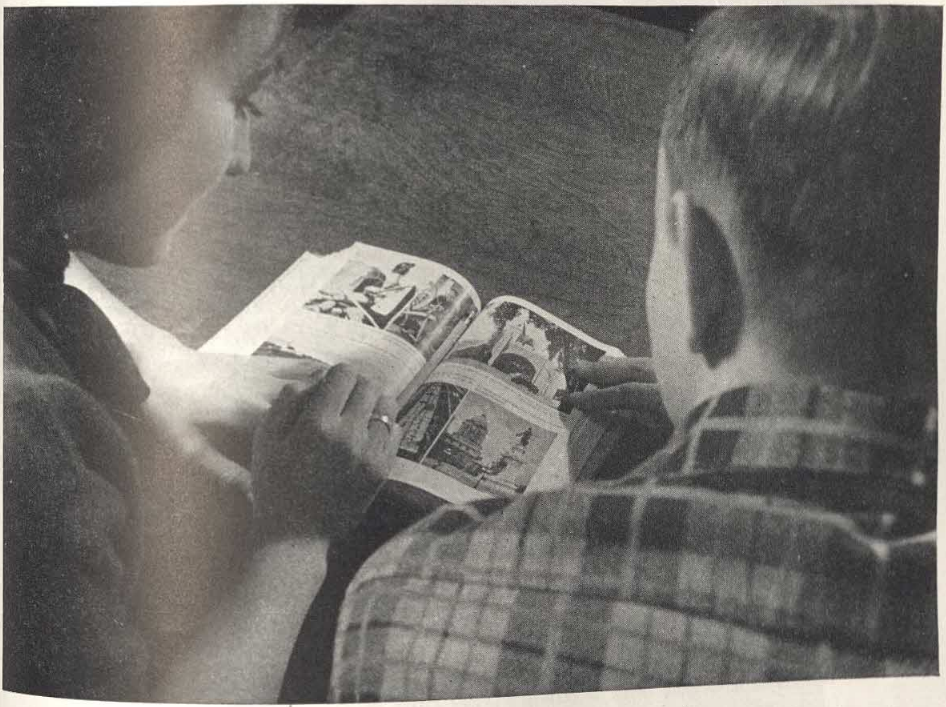

Fig. 16.6. Pictures add concreteness and meaning to language study.

several pictures showing French influences in America are also used (Fig. 16.6).

During this phase of the work, both pupils and teacher gather illustrative material for a bulletin board display. Postcards and magazine pictures of French Canada, dolls and rugs made by peasants in the Gaspé area, and photographs taken by several pupils' families who toured the region are used. Some of this material is used as a frame of reference for vocabulary drills and oral practice.

After six chapters have been read Miss Johnson inquires if the class would enjoy seeing a French film about the area they have been studying. "Oui, Mademoiselle," they answer.

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[13] Mathurin Dondo and Morris Benman, *French for the Modern World*, Book One, Harcourt, Brace, New York, 1951, pp. 141 ff.

Using the Language Film

So that the film will have worth-while results rather than providing merely a pleasant interlude, Miss Johnson plans several days of activities around it.[14]

On the first day she reads the film narration to the class, writing new words on the board for the pupils to copy and study before the film is shown.

On the second day a film on French Canada[15] is shown twice, with time given between showings for questions and clarification. After the second showing the class is asked to repeat phrases remembered from the film or to make descriptive comments of their own in French. The pupils themselves are surprised at the number of phrases they are able to remember or to say in their own words; there are nearly twenty such statements from the class as a whole.

Prior to a third and final showing the next day Miss Johnson repeats much of the narration, particularly the sections with which the students had difficulty the day before, and again emphasizes the new words. This time, when the film is finished, she asks the pupils to write about what they have learned about French Canada from the film. Marilyn's is as follows:

le français

Je m'appelle Marilyn
mercredi, le 21 fevrier

(une)
1. Québec est en réalité de partie de France dans le nouveau monde.
2. Les maisons sont trés vieille(s).
3. Les toits pointus et les rues étroites ont peu changé.

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[14] See Laura B. Johnson, "Mechanical Aids for Learning Languages," *French Review*, October, 1949, pp. 37–39, for discussion of a similar film lesson.

[15] *French for Beginners* (Sound, 10 min., B&W, Carl F. Mahnke Productions). "This film presents a good picture of the life, customs, architecture, and scenery of French Canada today. The vocabulary is based on words of high frequency and well within the range of first-year students. The sound track is clear, and the rate of speed keeps the content easily comprehensible throughout. The film is highly recommended for creating an interest in our neighbors to the north, and in developing pronunciation, oral comprehension, oral facility, and vocabulary."

(la)
4. Les coutumes et les mœurs et le religion ont peu changé aussi.
5. Voici un couvent Catholique.
6. On peut voir dans le village de petites églises.
7. Les paysages sont trés pittoresque(s).
8. "Vous pouvez arrêter ici pour mange(r) fumer, et vous reposer."
9. Les femmes se servent des mêmes rouets que leur mère et leur grandmère.
10. Voici un canot de bois.
11. Québec a été la scène d('une) bat(a)ille entre les Français et les Indiens.
12. La scéne de la bat(a)ille est au'jourd'hui un parc.
13. Nous trouvons dans le parc une statue de Jeanne d'Arc.
14. Les habit(a)nts sont trés pittoresque(s).
15. Les Canadiens font cuire leur pain dans les fours.
16. Les tapis sont trés beaux.
17. Les gens sont fiers des tissages.
18. Il y a des chutes d'eau partout.
19. Le fleurie coule entre les hautes falaises.
20. Voici sa tombe.
21. Une cathédrale s'appelle Ste. Anne de Bea(u)pré.
22. On peut voir beaucoup (de) chutes d'eau.
23. Dans le canot vous pouvez pêcher.

Marilyn is one of the better students. Her list of statements, by actual count, has only fifteen minor errors, including nine in spelling or gender, three omitted accent marks, and three omitted prepositions or articles. Robert, an average student, writes fifteen statements with only minor mistakes (such as French children themselves often make) on such things as agreement of adjectives, and verb endings. The important point is that he is enjoying the satisfaction that comes from putting into French what has meaning to him.

Using Folk Songs on Records

Before beginning this unit the pupils learned "Alouette." They enjoyed hearing it in the film. On the fourth day of work on this part of the unit Miss Johnson brings in four records of French-Canadian folk songs such as "Vive la Canadienne" and "A la Claire Fontaine."[16] The words are before the pupils when they listen to the records (Fig. 16.7), and after each record they are called upon to pronounce the words as they heard them.

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[16] Victor Recordings. "A la Claire Fontaine" and "Vive la Canadienne" sung by Le Quatuor Alouette, Montreal, Nos. 56–5108 A & B; "C'est l'Aviron qui nous mène" and "Youppe, Youppe, Sur la Rivière," sung by Les Grenadiers Supérieux, Nos. B-1269 A & B.

Miss Johnson calls attention to such details as linking, elision, mute *e*'s, and pure vowel sounds.

After mastering these points, the pupils sing along with the records and become familiar with the folk songs they like best. The piano in the classroom is used to accompany them after the songs have been learned.

Fig. 16.7. Foreign speech, literature, and songs can be heard in any classroom by means of foreign-language recordings.

Language Application

As a culminating activity a charming French-Canadian woman is invited to come to the classroom on the fifth day to talk with the pupils and answer questions they have prepared in advance. Their great surprise and delight on discovering that they can understand and be understood by a native French woman will warm the heart of any teacher. But more than that, this experience supplies a purpose and a realism to language study which could be gained in no other way than by visiting the land where the language is spoken.

Evaluation

What of the outcomes? Does the procedure Miss Johnson uses really lead to more effective language learning? Are the time and energy spent in the activities warranted? Let Miss Johnson herself answer:

"Although these activities occupied the major part of five class periods, I do not feel that any time was wasted, nor that any basic objectives of a language course were even temporarily neglected. On the contrary, such humdrum tasks as increasing vocabulary, improving pronunciation, developing oral facility and aural comprehension, were translated into pleasant and stimulating activities by the effective use of mechanical aids." [17]

The reader will not fail to note that the kind of outcomes just described are not achieved simply by flicking the switch on a projector or turntable. The stimulating guidance of an expert teacher who understands boys and girls and their interests is constantly evident. That such a teacher should whole-heartedly accept and use audio-visual materials in teaching modern languages is significant.

Using Other Audio-Visual Materials

We have seen how one teacher, in teaching a unit on French Canada, used the textbook, maps, recordings, pictures, handicrafts, a motion picture, and a native French-Canadian to give vitality, interest, and effectiveness to her class work. She might also have used many other materials and techniques, such as realia, radio programs, recordings, etc.

A teacher of Spanish in a junior high school in California describes the effectiveness of a "Spanish" store much like the one where functional English and arithmetic are practiced by elementary-school pupils. This store used cans, boxes, and bottles which had contained favorite foods, stuffed cellophane bread wrappers, wax fruit from the ten-cent store, and pictures of meat from refrigerator advertisements. Simple, indeed, but apparently effective. "After many years of teaching," says this teacher, "it still surprises me how much longer they seem to remember it [Spanish] and how much more fluent they are in its use when it is actually associated with the object, person or situation to which it refers."[18]

A college professor of German comments on the effectiveness of a series of radio programs prepared and broadcast by his class. "For the first time," he says, "at least in the case of some students, the grammar book became alive and German a living and functional thing. . . . No other class had ever developed *Sprachgefuhl* so early in the year and to a finer point than this class did."[19]

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[17] Laura B. Johnson, "Mechanical Aids for Learning Languages," p. 39.

[18] Mabel Claire Keefauver, "The Use of Audio-Visual Aids in the Study of Spanish in the Junior High School," *Education*, October, 1947, p. 121.

Linguaphone records have been used for many years in foreign-language instruction. These and other more recently developed courses that are on records offer such advantages as native speakers, repetition, and opportunities for guided imitation wherein students copy the speaker's intonation and pronunciation.

Publishers of elementary language textbooks are now producing records that are correlated with the textbooks. Some film producers are likewise producing records to accompany such films as *Une Famille Bretonne*[20] and *La Familia Sanchez*.[21] It is to be hoped that more language recordings, correlated closely with text and film materials, will be made available.

In addition to other advantages, the use of earphones with records holds considerable promise for individual and group study in libraries and classrooms. Furthermore, teachers report that recordings seem to carry a certain authority and validity for the students which they themselves lack. This somewhat unjust comparison might be attributed in part to student familiarity with teachers and in part to the fact that there is no way of arguing with a record. Whatever the reason, the fact remains that records are a source of stimulation of which the teacher can make good use.

The magnetic tape or wire recorder has the great and unique value of permitting the student to hear himself as he actually sounds to others. It can be used in a variety of interesting ways in improving aural comprehension and oral facility; moreover, it relieves the teacher of some of the need for endless repetition. It is excellent for recording group songs, choruses, and rehearsals of any sort, as well as for individual remedial work on pronunciation. Miss Johnson's class, for example, prepared a program and recorded it on disks for the pupils of a school in Germany; final rehearsals and refinements were all worked out with a tape recorder. The resulting enthusiasm and interest in the project were reported to exceed the most optimistic expectations.

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[19] William Fraunfelder, "Radio as a Teaching Device in German," *German Quarterly*, January, 1951, p. 35.

[20] *Une Famille Bretonne* (A Lesson in French), Sound, 10 min., EBF.

This is the story of the film *French Children* told in simple French by a teacher-narrator who was born in France. In the present tense and without any subjunctives, the narration is directed at beginners and provides valuable practice in understanding spoken French. The film depicts family life on a farm in Brittany, showing the work done by each member of the family; it also includes scenes of the village school and a neighboring town. A recording of the French narration accompanies the film for practice and review.

[21] *La Familia Sanchez* (A Lesson in Spanish), Sound, 10 min., EBF.

This is the story of the film *Spanish Children* told in simple and slow-paced Spanish. The vocabulary and sentence structure meet the needs of beginners. As the child watches real Spanish people going about their daily tasks, he listens to a description of what they are doing in the language they speak. The film provides a delightful visit with a rural family of southern Spain, with particular emphasis on the activities of the children. A 12-inch record, in Spanish, accompanies the film for practice and review.

Although a project like that just mentioned is considerably out of the ordinary, pupils generally derive much stimulation from any use of a tape recorder. The fascination of hearing one's own voice played back, the complete objectivity of the instrument, and the close attention typically given it by everyone present add a dramatic quality which appeals to the "ham" in all of us. Far from being undesirable, this is a characteristic which an alert teacher puts to good use.

The language teacher who conceives of French, German, Spanish, and other modern languages as a means of communicating with and understanding the world in which we live has much to gain from audio-visual materials. Probably no other subject in the curriculum can profit more from the effective use of these dynamic tools of learning. In the words of the Wisconsin Curriculum Bulletin: ". . . Through the use of this type of equipment a modern language becomes a 'social study' in the broadest sense of the word and is linked to almost every subject in the curriculum and to almost any interest that the student might have. Such a program does not omit the basic grammatical aspects of the language but vitalizes them through dynamic contact with the language as it is used by a foreign people."[22]

HIGH-SCHOOL BIOLOGY—ABOUT *LUMBRICUS*

"Have you ever been curious about worms? Aside from the fact that they are good for fishing bait, earthworms are really quite fascinating. They have a rather remarkable ability, for example, to grow a new head or tail if a hungry robin happens to pull off the old one." Thus Mr. James begins his biology class one morning.

"Even though worms are not much to look at there *are* ways in which they resemble *us!* You don't believe it? Well, let's see. Some of you seem to have some ideas on that. Jerry?"

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[22] Wisconsin State Department of Public Instruction, *op. cit.*, pp. 16–17.

Jerry thinks that maybe worms have stomachs. Jane says that she sometimes hunted night crawlers on the lawn with her dad when she was a little girl and remembers that they pulled back into the hole in a hurry when the flashlight beam hit them, so they must have pretty good muscles.

"Yes!" agrees Bill. "And they've got nerves, too, or some kind of feeling system, else they wouldn't thrash around on a hook like they do."

Bill's remark draws suppressed squeals from several of the girls in the class, and grins from the boys.

Mr. James smiles and continues.

"Good points, all of them. Can you think of any others?" He moves to the chalkboard and writes "Digestive System," "Muscular System," and "Nervous System."

Further discussion suggests that worms must have some means of reproduction, so he adds "Reproductive System" under the other terms.

Judging that this line of questioning has gone far enough to establish a connection with things already known, Mr. James takes another tack.

"There are some other rather unusual things that we could learn about earthworms. For example, how they work their way through the soil, what they eat, and particularly how, aside from bait, worms are vitally important to you and me."

With this lead, the discussion proceeds for a time along lines intended to do two things: (1) to arouse further interest in the subject of earthworms and (2) to establish a purpose in studying them.

Before interest begins to slacken, Mr. James brings the introductory discussion to a close and suggests that they summarize the questions that have been raised. This results in a list of specific questions, such as:

1. How do worms work their way through the soil?
2. Why are earthworms important to us?
3. What do they eat?
4. How do they reproduce? Do they lay eggs?
5. What happens to earthworms in the wintertime?

With the period now about half over, Mr. James says, "Thinking that you might be interested in the subject of earthworms, I arranged for a film that may help us answer some of these questions. It's a good film and I think you will enjoy it. Keep in mind the questions we have here and see if you can find some of the answers."

The projector has been set up and threaded ahead of time by one of the several operators in the class, for the showing of this film has been scheduled previously. The dark shades are pulled quickly and the film, *Earthworm*,[23] is shown.

After the film ends, Mr. James asks how many have found answers to their questions. About half the pupils raise their hands.

"What was the difficulty for the rest of you? Jean?"

"Well, I found some of the answers all right, but there was so much there that we hadn't talked about that I got mixed up, I guess."

"Ralph?"

"I didn't see anything about what worms do in the wintertime."

"Tony?"

"There were quite a few names that were new to me. Maybe that made it hard to keep up—I don't know."

"How many of you found it interesting even though you couldn't follow everything in the film?" This time there is general assent.

"That's fine. We'll discuss those questions tomorrow. Meantime it would be a good idea to find what your text has to say about the questions. The reference is on the board. There is also a list of interesting articles posted in the library; you may want to read them while we are studying earthworms."

The next day when the class comes into the room, a large-scale model of an earthworm is on display and on the front wall is a good-sized wall chart like that in Fig. 16.8. Mr. James has also put several colorful pictures on the bulletin board under the heading, "How Does the Earthworm Live?" The display is only partially completed, but several pupils stop to look at it.

Discussion gets under way promptly on the questions raised the day before.

"Who can explain how the worm moves about? Victor?"

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[23] *Earthworm*, Sound, B&W, 20 min., British Information Services.

It describes the internal structure by means of dissected studies and illustrations. Digestive, circulatory, excretory, and reproductive systems are stressed. Animated diagrams of the processes of coition, egg laying, and cocoon formation are presented; the film ends with the birth of new individuals.

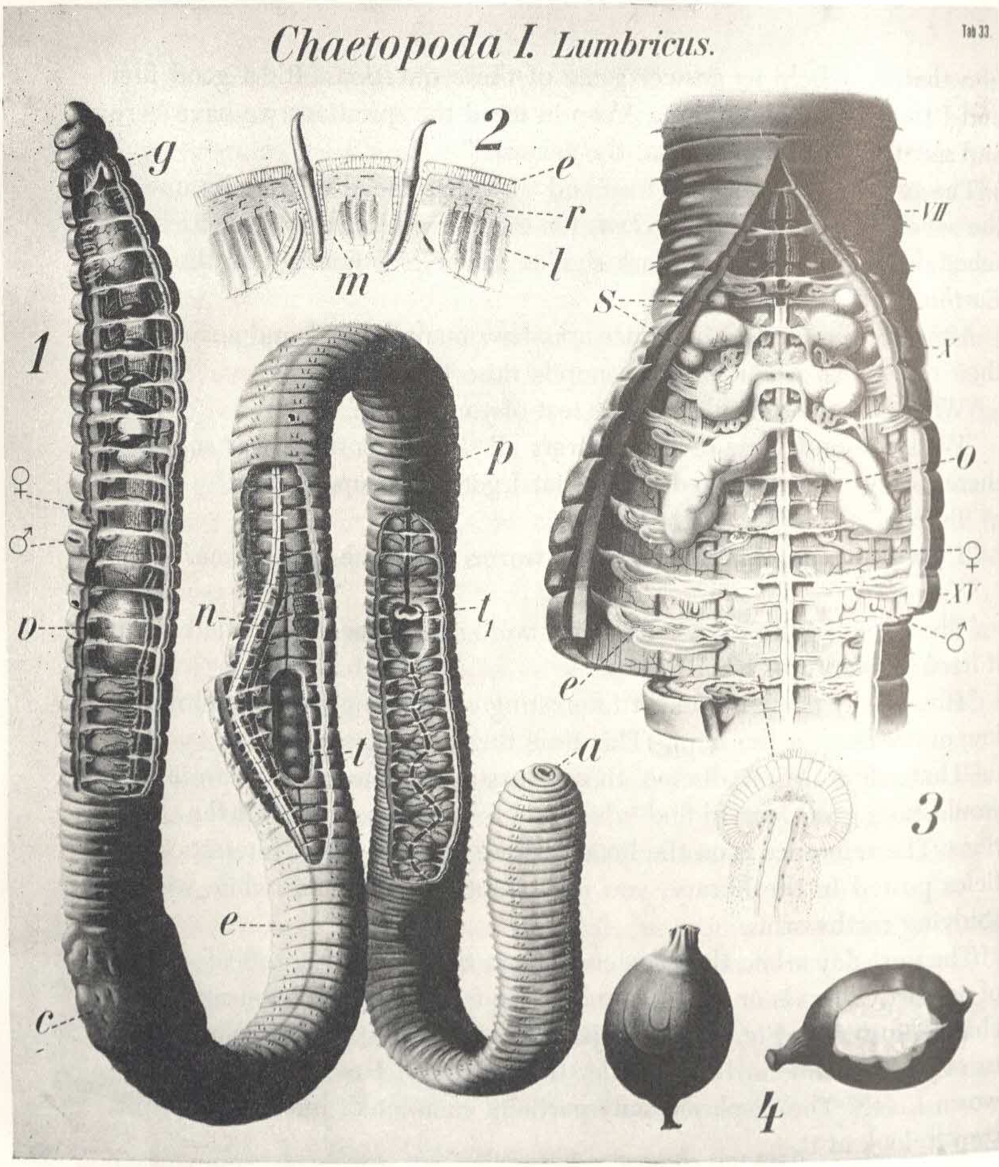

Fig. 16.8. A wall chart is useful for group study of details. (Courtesy of Denoyer-Geppert.)

"They crawl along on some kind of feet—I think the book called them 'bristles.' They act something like hooks. The worm hooks onto the ground with his back bristles and pushes forward with his head and stretches out. Then he hooks onto the ground with his front bristles and pulls his back part up to the rest of him."

"That's very good, Victor. Who can show us these bristles on the chart?"

Jane points them out on the wall chart, which is large enough to show such details quite clearly.

Someone asks how the bristles are controlled. This, in turn, leads to a consideration of muscles and nerves and whether or not the earthworm has a brain. The model (Fig. 16.9) is helpful in identifying muscular, nervous, and circulatory systems, because it shows the interior structure of the worm in three dimensions. Mr. James refers from wall chart to model and back again repeatedly during the discussion.

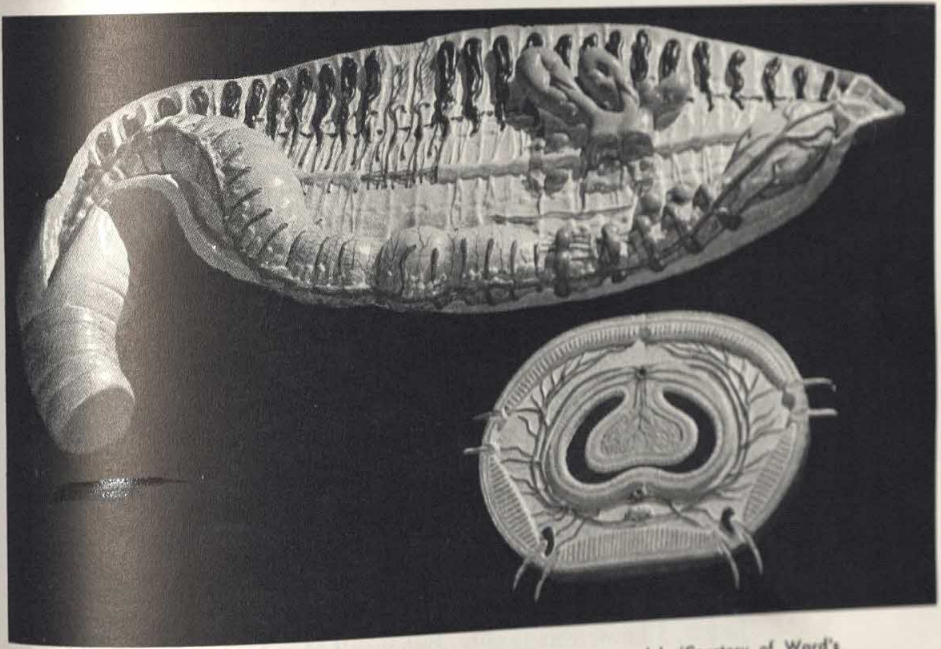

Fig. 16.9. Actual relationships of organs can be clearly shown in a model. (Courtesy of Ward's Natural Science Establishment, Inc.)

Several of the boys volunteer to bring in some worms for closer examination. Study of these worms results in a variety of interesting observations as to how they crawl, the lubricating liquid on their body surface, and the girdle.

A few worms are placed in a battery jar full of damp earth and left for several days. Occasionally a worm is seen burrowing its way through the soil next to the glass. Carefully removing a section of the soil after it has dried out somewhat makes visible a network of little tunnels. Several boys check the entomology journals to discover the importance of earthworms in ventilating and constantly mixing the soil.

By this time Mr. James feels that there is sufficient interest and information to warrant dissecting a number of worms. When he suggests this, he gets a good response from about a dozen pupils. He does not urge the more reluctant students to do the dissections themselves; instead, he suggests that the class work in pairs so that those who do not participate directly can observe.

If the experience is to have value, Mr. James knows that a few guideposts must be set up. Otherwise, cutting up a worm may prove to be an end in itself rather than a means to a better understanding of earthworms.

"Before we start dissection, does anyone have a question? Ralph?"

"I'm not sure I know how to go about it—just how to start, I mean."

"That's a good point, Ralph. We need to know that, don't we? Any other questions? Judy?"

"Well, I think we need to know what to look for, too—more than just in general, that is. Otherwise we might miss something or cut through it without seeing it."

"Very good, Judy. How many would agree with Judy? Quite a few would."

Jean somewhat reluctantly raises her hand.

"Mr. James, I know this is silly, but won't this be terribly painful for the worms? I mean that—well, it seems rather inhuman to just cut up live worms to see what's inside."

"I'm very glad you asked that, Jean, because it hadn't occurred to me and doubtless others feel the same way. Actually these worms we will dissect are specimens which have been chloroformed and preserved in alcohol for just this sort of work. We could use live worms but we would chloroform them first. That is a painless way of killing them.

"Now Ralph thinks we need to know more about how to dissect a worm and Judy says that we need to know what to look for when we do this. Can anyone think of a good way to answer these questions?"

Someone quickly suggests that they again see the part of the film in which an expert is dissecting a worm. Mr. James agrees but takes the opportunity to say that a number of technical terms are involved. These terms—"cuticle," "epidermis," "esophagus," "larynx," "crop," "alimentary canal"—must be understood if the dissection is to be followed. They are thereupon discussed briefly and the pertinent section of the film is shown.

After this, the dissection process is discussed and the students are ready to go to work in the laboratory. Their work on dissection answers many questions but raises others which may become the basis for further activity: "How long does a worm live?" "What other kinds of worms live in the soil?" "Does the earthworm do any harm to crops?" "Can you get too many worms in a given piece of ground?" "What keeps worms from drowning when it rains?" "How do they breathe?" and so on.

Each question may be investigated by an individual or a group. Some leads will prove more useful than others for Mr. James' objectives in this study of earthworms, but he encourages the pupils to track down the solutions so that their curiosity will be satisfied. At appropriate points he provides for summaries, for integrating what has been learned into clear concepts. These, in turn, are applied to generalizations such as adaptation to environment, food-getting processes, locomotion, reproduction, and defenses against natural enemies. Mr. James also plans for tests of one kind or another to measure progress and the effectiveness of the methods he is using.

It will be interesting to turn back the calendar a few days to see how this lesson came to be.

Mr. James, like all teachers who are approaching a new unit of science work, had to find practical answers to the questions: (1) What learning difficulties are involved in this study of earthworms? and (2) How can these difficulties best be met?

Looking at it from the pupil's viewpoint, as every good teacher does, he lists the following practical difficulties:

1. While somewhat familiar to most pupils, earthworms are naturally neither attractive nor interesting to the average youngster.
2. Most of the earthworm's life is spent underground, out of sight and out of mind. Probably most of my pupils have never considered the earthworm as in any sense valuable to man or as typical of a class of animals. How can these phenomena be shown effectively?
3. No one can really understand the structure of the earthworm without

dissecting it. This will attract some students but repel others. How can I change the latter attitude? Also how can sufficient skill in dissection be developed without spending too much time on it?

As solutions to the above, Mr. James draws up the following plan of attack:

1. Start with what the pupils know about worms and appeal to the children's curiosity about themselves and the world around them. Motivate them with one or two striking and unusual facts about worms and base the discussion on known similarities to other animals.
2. Since we do not see earthworms close up very often, I'll ask some pupils to bring some to class and put them in a battery jar that contains some earth. Then we'll see what they do to the soil. Use a wall chart for general structure, and a model for structural relationships. Use the *Earthworm* film for introductory overview; show it again later for detail. Arouse curiosity questions prior to showing the film; follow the film with a discussion of these, and plan for further activities.
3. These "further activities" should lead to a consideration of dissection. By now, if earlier steps have been well handled, some will go along with the idea. Don't force it; let the other pupils observe. Show part of the film to demonstrate dissection processes. Discuss vocabulary before seeing the film. Suggest that dissection be followed up by notebook drawings.

This, in part, is the way one teacher went about the learning problem in his biology class. Various other ways might work equally well, for teaching is an art, and as an art it has no rigid rules of procedure. Good teaching does have sound fixed principles, however, which are based on the nature of the child and on how he learns. Two of these principles are: Think always in terms of the pupil and his needs, and make the learning experience realistic and vivid to him by every possible means.

Prominent among these means are the audio-visual materials used by Mr. James and his class. Note that he introduced them naturally where they would do the most good. In no way did he minimize text and reference materials, but he recognized that the study of earthworms also requires appropriate audio-visual materials including the worms themselves.

Note also that neither by word, thought, nor action did Mr. James suggest, as sometimes happens, "Now that we've seen the film, let's get back to the lesson." The film *is* the lesson; the text assignment *is* the lesson; the chart, the chalkboard, the model, the worms and the other materials that have been or will be used—all are integral parts of the lesson and were so regarded by both him and the pupils.

By being thus used, the materials of instruction can reach a new "high" in effectiveness. Audio-visual materials, like the reading materials which are carefully chosen and used well in terms of the student's needs, will thus come of age. When they function at full capacity, they become more than simply aids or crutches for either pupil or instructor. They become true media of communication for both learning and teaching.

SUMMARY

The most effective use of audio-visual materials of instruction is attained when they are selected and used in terms of their known value in creating or re-creating realistic and interesting learning experiences.

The teacher assumes several key responsibilities when selecting and using audio-visual materials in the classroom. Among them are (1) definition of learning goals, (2) selection of learning experiences, (3) correlation of appropriate learning experiences, and (4) guidance of the class in using these materials in accordance with the best research and utilization principles.

Suggested Activities

1. Visit classrooms to observe how audio-visual materials and techniques are being used. Select classrooms which are close to or identical with your professional training or teaching interests.
2. Use audio-visual materials or techniques in your own day-to-day teaching or practice teaching:
   a. Set up objectives or goals.
   b. Preview and select instructional materials.
   c. Plan introductory interest-inciting activities.
   d. Provide for the planning of purposes by the pupils.
   e. Secure selected audio-visual instructional materials and arrange for their actual use.
   f. Tentatively plan follow-up activities.
   g. Objectively evaluate outcomes in terms of pupil interest, understanding

of new information, pupil initiative in pursuing self-inspired activities, etc.

This last may be an objective measure of your grasp of the significance of the role of audio-visual materials and techniques in implementing the curriculum and improving instruction.

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17. Local School Administration and Audio-Visual Materials

PRINCIPLES GOVERNING THE ADMINISTRATION OF AUDIO-VISUAL MATERIALS

As is true of any phase of administration in local school systems, the administration of audio-visual materials and equipment demands a widespread appreciation of their importance. Some of the most important considerations in this connection concern (1) who shall select materials and equipment, (2) the superintendent and audio-visual materials, and (3) the teacher and audio-visual materials.

WHO SHALL SELECT MATERIALS AND EQUIPMENT?

The teacher has long been recognized as practically the determining factor in child development so far as the school is concerned. Teaching may well be defined as the stimulation of learning. Learning at its best is the process of discovery. It is therefore clear that to a high degree the effectiveness of both teaching and learning is determined by the kind and adequacy of available instructional materials. This is especially true of audio-visual materials and equipment.

In terms of educational significance, by all odds the most important aspect of the administration of these materials and equipment is their selection. Teachers should have a large part in selecting them; but the ordering, payment, storage, inspection, and mechanical maintenance are not functions of teachers. The staff members who are responsible for overall management and service maintenance should assume these functions with respect to audio-visual materials and equipment.

Long ago it was proved that both teachers and children must participate in the selection of textbooks if the wisest choice is to be made. The sound selection of audio-visual materials demands the judgment of both teachers and children just as does the sound selection of textbooks.

The selection of learning materials and equipment is a joint responsibility of pupils, teachers, supervisors, and administrators. It does not involve one or the other; all must help. Where differences of opinion arise, a practical compromise must be worked out and arrangements made to determine the educational results of the choices made.

The period 1945–1950 marked the sharpest increase in the school use of audio-visual materials and equipment in any five-year period up to then. One of the major reasons for this was the experience so many parents had had with such materials in the armed forces. During 1945–1950 many school board members who had served in the armed forces raised a question as to why more extensive use was not made of these instruments in the local schools. This familiarity with the potentialities of audio-visual materials was sometimes greater among board members than among superintendents, and often prompted enthusiastic members to participate in the selection of such things as projectors, screens, maps, globes, and charts. This practice is most unfortunate, for it violates the basic function of a school board—policy formulation. Ultimately it will prove just as unfortunate, if not disastrous, as selection of textbooks by the school board.

The board of education is a policy-making and not a supervisory body. It is the board's function to make sure that things get done—not to do them. But since policy formulation, educational as well as financial, is one of its functions, a board of education has a unique responsibility with respect to both the selection and the utilization of audio-visual materials and equipment. This is so because of the unusual contribution of audio-visual methods to the teaching and learning processes. It has been established that the wide and intelligent utilization of these materials and techniques increases the effectiveness of teaching and learning at all levels. This is particularly true of boys and girls whose learning capacities are deficient or limited in terms of the printed page, and also of teachers who are deficient in a particular professional skill or experience. Since the board of education is basically concerned with the fullest development of children and the maximum effectiveness of all the staff, particularly the teachers, it is especially important that it make sure that sufficient funds are provided for necessary and adequate audio-visual materials and that the teaching staff is fully conversant with and highly skilled in using them. Thus although it is essential for board members to have an intimate understanding of the importance of these materials, they should be purchased only when recommended by the superintendent and supported by specifications.

THE SUPERINTENDENT AND AUDIO-VISUAL MATERIALS

The point of view or attitude of the superintendent has a marked influence on the whole question of audio-visual materials and equipment. The superintendent must realize that, regardless of the size of the school system, the administration of audio-visual materials must be specifically assigned. This assignment should not be "tacked on" to an already full-time job. In small school systems it will constitute a part-time job, but in larger systems several persons will be required for it.

It has become customary to give some such title as "Director of Visual Education" to the person immediately responsible for the administration of audio-visual materials and equipment. This title is justified if there is a clear understanding of the function of such a person. To be sure, this individual should possess and exercise leadership qualities in connection with the importance and use of audio-visual materials and equipment, but directors of audio-visual education are basically coördinating and service agents for classroom teachers. They must not try to be "the whole show," or in any way act as if they are anything other than partners of their professional colleagues, the learners and teachers.

Screening films and filmstrips and examining maps, globes, charts, models, exhibits, recordings, scripts, etc., should be recognized as regular teaching duties, as are reading, planning class activities, and making out examinations; no special allotment of time should be made for such work. On the other hand, a few teachers should be assigned to special committees in connection with the examination and appraisal of audio-visual materials which demand time far beyond that required in their regular line of duty. Some of this committee work may be assumed infrequently for short periods without any adjustment in the regular teaching load, but the teachers who are regularly assigned major responsibility in connection with the selection of audio-visual materials must have their teaching load reduced.

Superintendents must recognize that if audio-visual materials and equipment are to be of the requisite quality and amount, adequate funds must be available. Too often in the past some superintendents have stated that they favor extensive use of such materials but have made no attempt to arrange for them in the budget. This produces frustration and indifference in a staff that is anxious to use them.

One of the major responsibilities of school superintendents is to make sure that boards of education understand the function and values of audio-visual materials and equipment. In a recent conference with a board of education it was strongly recommended that these techniques be used more widely. The president of the board, a highly intelligent, successful businessman, immediately commented, "Oh, we could make the teaching easier, couldn't we?" "No," was the answer, "you would make both learning and teaching more effective." There still prevails in too many quarters the impression that films and filmstrips are nothing more than school movies.

Just as some superintendents have failed to recognize the necessity of recommending adequate funds for audio-visual materials, similarly some boards of education have failed to approve recommended budgets because they did not appreciate the effectiveness of these devices. To make sure that the boards have deep insight into the underlying reasons for the wide use of these materials in school, superintendents would do well to arrange for actual class demonstrations of their use. Such a demonstration might well be the reason for calling a special meeting of the board.

Constant appraisal of the results of the audio-visual program should be carried on by the superintendent. Only in this way can he have reasonable assurance that the school funds appropriated for such purposes are being efficiently used.

Films, filmstrips, charts, diagrams, and models of proposed school buildings are effective for the superintendent not only as a means of reporting to various lay groups but also, particularly when accompanied by appropriate comments, as a way of making the people aware of the value of audio-visual materials.

THE TEACHER AND AUDIO-VISUAL MATERIALS

Unfortunately, a large majority of the present teaching staffs of local school systems have not had the benefit of specific training in the use of audio-visual methods. This can be remedied and wide and intelligent use of audio-visual materials be made only if a vigorous in-service training program to this end is inaugurated. These programs will be most effective in some localities if the faculties of nearby educational institutions are utilized. However, members of local school staffs such as supervisors, principals, and specially assigned teachers must also exert considerable leadership in overcoming the lack of training in the use of audio-visual materials.

Teachers who have recently graduated from college or university should be familiar with audio-visual materials and equipment in their areas of specialization. If these teachers find that available materials are inadequate, they should bring this to the attention of their fellow teachers and the entire staff should unite in advising the superintendent of schools about it. Recently graduated teachers soon discover that they can and must learn much from experienced teachers especially in connection with specific details of the school's operation. Experienced teachers similarly should realize that younger teachers may be able to contribute markedly regarding the use of audio-visual materials and equipment.

By and large, both the training and experience of teachers are particularly deficient with respect to recordings. In many teacher-training institutions that give considerable attention to the use of motion pictures, filmstrips, and slides, little consideration is given to recordings and radio. Similarly in many school systems that have projectors, screens, and the necessary attendant equipment, there is a marked absence of adequate, or in some cases any, recording equipment. It is the teacher's responsibility to advise the administration what material, equipment, and supplies are needed in order to make the classroom a better place in which to learn.

There is some evidence that, when principals and superintendents have failed to make adequate budgetary provisions for audio-visual materials, the teachers themselves have not forwarded requests for the material required. Although the actual preparation of the school budget is ultimately in the hands of the superintendent, good budgetary procedure provides for teacher participation in this function; hence it becomes the teacher's duty to inform the superintendent just what materials are needed for effective work.

Teachers must realize that audio-visual materials are unique instruments for both effective teaching and effective learning. They must also be keenly aware of the constant supply of new films, filmstrips, and other audio-visual materials. Perusal of bibliographies of films, filmstrips, slides, maps, globes, charts, models, and exhibits should be just as strong a habit among a teaching staff as the habit of reading bibliographies of textbooks, pamphlets, and other similar materials.

Librarians can give teachers much assistance in keeping up to date on audio-visual methods. On the basis of requests by interested groups, departments, or some other unit, the school librarian may well forward regular reports of new developments in the audio-visual field.

As is made clear elsewhere in this book, the individual teacher's ingenuity has great opportunities in connection with school-made audio-visual aids of a wide variety. Projects planned for and executed jointly by teachers and pupils offer great possibilities.

There is danger of a "let George do it" attitude on the part of the individual teacher in connection with the selection and evaluation of audio-visual materials. "George" in this case is likely to be the director of audio-visual education. The expression of this attitude, in the form of indifference to the selection of audio-visual aids, deprives teachers of the pride that comes from having participated in an activity and it also deprives boys and girls of the benefit of their teacher's experience in helping to formulate judgments.

PRACTICES IN THE ADMINISTRATION OF AUDIO-VISUAL MATERIALS

"We have an audio-visual program at our school," a parent told a visitor. "Every Friday afternoon at two o'clock the children all gather in the auditorium to see movies."

"We have movies in the auditorium every noon," the visitor replied. "Some of them are very good and the children who stay for the lunch period put their time to good use. I suppose one could call that an audio-visual program, too . . ."

Actually these are only casual beginnings. These too-often-heard descriptions of an "audio-visual program" are one extreme of what such a program often is but should not be. What is needed are well-organized, thoughtfully planned and administered programs for improving instruction through the use of modern audio-visual materials and techniques.

Where to begin? Where to approach the problem of administering an effective and useful audio-visual program?

NATURE OF AUDIO-VISUAL ADMINISTRATION

Let us think of audio-visual administration as the formation, execution, appraisal, and reporting of policies and practices leading toward the improvement of instructional methods and techniques in educational institutions.

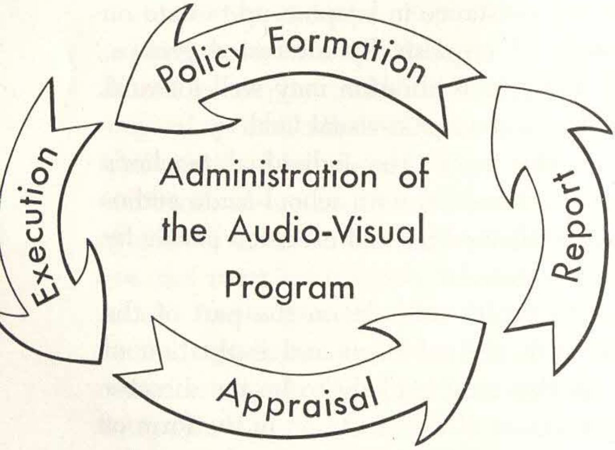

Fig. 17.1.

These processes occur simultaneously, even though sometimes one leads into another. They may be thought of as closely related and never-ending, as the superintendent, principal, supervisor, and teachers continue to work together toward the solution of a basic problem. *How may instructional techniques be evaluated and constantly improved?* The process is visualized in Fig. 17.1.

The question of how to "get started" on a program of audio-visual instruction can be answered in many ways, such as the following:

1. The existing instructional materials and methods can be surveyed and recommendations made.
2. Study and policy-forming committees of teachers, supervisors, and administrators can be set up.
3. New equipment and materials can be purchased and placed at the disposal of teachers and pupils.

4. A director of audio-visual instruction can be appointed and given the responsibility.

All these approaches and many others have been tried in different school systems with varying success. All represent a way of beginning an attack on the problem of planning and establishing a program of audio-visual instruction. More important than these, however, is a *desire to attack the problem.* But before attack can be effective, knowledge of the current status of audio-visual techniques is required.

APPRAISING EXISTING AUDIO-VISUAL MATERIALS

The administrative officer, principal or superintendent, should initiate the survey of current audio-visual procedures in the local school system.

Because audio-visual instruction is in essence a way of providing learning experiences in the classroom, the survey should ask such questions as: Is it certain that the things studied in the classroom are socially useful? Is it certain that the most effective teaching techniques available are being employed in pursuing these curriculum objectives?

Matters pertaining to audio-visual instruction are actually curriculum matters. Because the curriculum is the sum of the many responsibilities which the teacher assumes, it is imperative that the teachers themselves participate to a major degree in any survey of audio-visual materials and their use.

The Teacher's Role

An effective program of classroom-centered audio-visual instruction begins in the classroom, and the teacher is the one who guides it. Hence any investigation of audio-visual instructional techniques must begin by examining his role and the teaching procedures he employs.

A school may be well supplied with audio-visual equipment and materials and yet have a very inadequate program of audio-visual education. Conversely, a school may be very poorly equipped in this respect and yet, because of a teacher's imagination and ingenuity in using these limited facilities, rank high as far as achieving reality in teaching is concerned.

Too often a teacher says, "I am very interested in audio-visual education, but the materials cost money and we have little money." But there are many things a good teacher can do with materials already at hand—the chalkboard, the tackboard, trips into the community, the construction of models, specimens brought to the school—in order to achieve a high level of effective audio-visual utilization.

The highest level of audio-visual teaching is attained when an enlightened teacher is given a complete array of audio-visual tools and materials from which, through imagination and ingenuity, to develop a realistic learning environment.

"The intelligence and ability of the teacher in selecting and making the best use of available materials in terms of the learning need and interest of the children will always be a determining factor in the effectiveness of the audio-visual materials in instruction. The right material used at the right time in the right way is a goal simply stated but difficult to achieve."[1]

The following questions will enable teachers, supervisors, and administrative officers to determine the prevalence and the efficiency of use of audio-visual materials:

1. Does the teacher use the following in meeting the classroom learning needs of pupils?
   a. The chalkboard.
   b. The tackboard.
   c. Maps, charts, globes, models.
   d. Files of flat pictures.
   e. Slide projector (3¼″ x 4″).
   f. Combination 2″ x 2″ slide and filmstrip projector or equivalent.
   g. Motion-picture projector: Silent....... Sound.......
   h. Opaque projector.
   i. Phonograph.
   j. Radio.
   k. Combination speed turntable 33⅓ and 78 r.p.m.
   l. Sound recording device (tape preferred).
   m. Public address system (one way).
   n. Field trip (bonded carrier provided).
2. Does the teacher evaluate and select the audio-visual materials used? No one shares the teacher's unique position. He knows intimately the instructional needs of the learner. He can judge best how these needs

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[1] Paul Reed, "What Do We Mean by Audio-Visual Materials?" in *Using Audio-Visual Materials with Children,* Bulletin of the Association for Childhood Education, Washington, 1947, p. 5.

can be met through carefully evaluated and selected audio-visual materials. Thus, he is in the best position to judge their effectiveness.

Because of the nature of films, filmstrips, recordings, and transcriptions, definite opportunities must be provided for the teacher to preview, audition, and examine them. Two conditions should be met: The teacher should be informed of his responsibility for evaluating and selecting audio-visual materials, and the principal or superintendent should provide mechanical facilities and in some cases additional time for these functions.

a. Does the teacher serve on committees for evaluation and selection?
b. Does he use planned periodical preview sessions?
c. Does he keep permanent evaluation records of previews?
d. Does he recognize his responsibility for coördinating good materials with the curriculum?
e. Does he continually search for material that will best serve instructional needs?

3. Does the teacher know and employ tested techniques for using audio-visual materials effectively? Utilization techniques vary widely from school to school. To some schools a merely casual "showing" of audio-visual materials in the auditorium represents "use," whereas in reality the careful use of films, filmstrips, recordings, charts, models, etc., already described in earlier chapters is rightfully called "use."

It is reasonable to suppose that the manner in which audio-visual materials are used can mean the difference between a mediocre program and one which is highly effective in creating understanding and skills in pupils.

The following will allow the teacher to estimate the utilization level he is achieving:

a. Has the teacher a definite purpose in using audio-visual materials, such as arousing interest, developing habits and attitudes, imparting information, demonstrating techniques, enriching, or establishing a meaningful vocabulary?
b. Do the audio-visual materials form an integral part of the unit?
c. Does the teacher plan for effective use of audio-visual materials?
    (1) Does he regularly preview materials a day or two before using them in class?
    (2) Does he make use of available teaching guides?

   - (3) Does he recognize the need of preparing audio-visual presentation by
      - (a) Exploring pupil interests and needs?
      - (b) Supplying interesting supplementary explanations?
      - (c) Removing vocabulary difficulties?
      - (d) Assigning definite responsibilities to be assumed as the result of seeing or hearing the materials?
      - (e) Formulating the pupils' purposes in using the materials?
 - d. Does the teacher plan follow-up activities?
   - (1) Is there opportunity for clarification, discussion, and further inquiry?
   - (2) If the needs of the class warrant, is there opportunity for review?
   - (3) Does the teacher encourage such follow-up activities as discussion, oral and written composition, objective tests, mural drawing, model construction, choral speaking, creative dramatization, etc.?
   - (4) Are the pupils encouraged to voice their evaluations of materials?

4. Is the teacher alert to the physical aspects of audio-visual presentation? Very frequently, the physical conditions in which audio-visual materials are used are such that pupils do not associate their use with regular classroom study procedures.

The announcement, "Now children, we will join several other classes in the auditorium and see a film," often has unfortunate results—interruption of the work-study atmosphere of the classroom, a feeling that the visualized experience is not in any way associated with classroom study, and interruption or destruction of the pupil-teacher rapport achieved in the home classroom.

Pupils learn through association to recognize the classroom as the scene of planning, work, and study activities. The classroom itself should become the high-level learning laboratory which audio-visual materials and equipment can make it. Usually the best utilization procedures are employed when all the necessary materials and equipment of instruction are an integral part of one classroom environment.

Such questions as the following will reveal the extent to which the classroom is a true audio-visual learning environment:

a. Is the teacher able to secure needed audio-visual materials and equipment for use in the home classroom on the day and at the exact time he feels the children will profit most from their use?
b. Is the distance from the farthest seat to the screen not more than six times the width of the picture?
c. Is the distance of the nearest seat no less than twice the width of the picture?
d. Are the seats within a range of 20 degrees to the line of projection? (See Fig. 14.29.)
e. Is the teacher alert to the need of maintaining the classroom at the optimum temperature of 68–72 degrees?[2]
f. Is the teacher on the watch for acoustical deficiencies such as are caused by hard-surfaced walls and ceilings?
g. Does he know that simple cloth hangings, acoustical tile, or better placing of "speakers" will help overcome poor acoustics? (See Chapter 10.)
h. Is the classroom equipped with sun curtains, screens, shaded screens, etc., so that projected materials can be effectively used?
i. Are adequate loud-speaker ducts, wall outlets, etc., available?

5. Has the teacher recently attended an in-service audio-visual training institute, class, or special seminar?

Audio-visual methods of instruction are changing rapidly. The appearance of new films, filmstrips, maps, and transcriptions makes it desirable for the teacher to study such materials continually. A teacher who has had professional training in audio-visual methods should keep up-to-date by means of in-service training. The rapid progress being made in the field makes in-service study opportunities almost mandatory if the teacher is to keep informed.

The extent to which the answers to the above questions are in the affirmative indicates whether teacher-pupil use of audio-visual methods is effective. When questions are answered with a "no," the need for study and planning is evident.

A survey of the current level of use is the logical first step in improving an audio-visual program. The possibilities for improvement thus indicated must be acted upon. Teachers can help determine needs, but it is the responsibility and obligation of the principal and superintendent to take action regarding these needs.

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[2] National Council on Schoolhouse Construction, *Guide for Planning School Plants*, Nashville, 1949.

The Administrator's Role

Administrative officers share the teacher's interest in and concern for creating a learning environment in which the pupil may achieve a better understanding of his world. Whereas the teacher seeks to create realistic and meaningful experiences in one classroom, the administrative leader must coördinate the plans and needs and interests of many teachers in many classrooms. All this reflects the basic need for the best learning materials through which the school can interpret the world of today to learners.

Administrative leadership may be centered in the office of the school superintendent, subject supervisor, or school principal. But regardless of where it centers, the responsibility of providing teacher and pupils with the most effective learning environment possible must be met.

The administrator should be a motivational force in the use of audio-visual materials. He may assume this responsibility himself or delegate it to others. In one form or another, administrative leadership should assume responsibilities for the organization and coördination of effective evaluation and selection programs for teachers, for effective classroom use of audio-visual materials, for systematic acquisition of equipment, and for teacher participation in in-service training classes, institutes, and meetings devoted to improved audio-visual teaching techniques.

Administrative leadership in an audio-visual program can be exerted in many ways. In rural areas it may be provided by a supervising teacher or by a committee of interested teachers selected from townships in an entire county. In some states a full-time audio-visual supervisor is employed. This is the case in California, Virginia, Oklahoma, Illinois, Indiana, Texas, North Carolina, Tennessee, and Florida.[3]

In cities of less than 10,000, a part-time audio-visual director or supervisor is frequently assigned the responsibilities enumerated above. Or representative teacher committees may be given responsibility for evaluating, recommending, and to some degree supervising an effective program of audio-visual instruction. In large urban communities, usually those with over 10,000 population, a full-time audio-visual director or supervisor is frequently appointed. Such officers have central office responsibility in connection with audio-visual media.

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[3] Lloyd J. Cartwright, "The County Film Library, a Nationwide Survey of Current Organization and Operation of County Film Libraries," *See and Hear*, Spring, 1951, p. 19.

Regardless of the kind of local organization, certain standards of functional performance are desirable. The following questions will enable supervisors, administrators, and their duly appointed officers to determine the efficiency and completeness of administrative responsibilities in formulating audio-visual policy:

1. Do teachers as well as all other members of the school's instructional and administrative staff have an active voice in determining what kind of audio-visual program the school shall have? (See pages 498–499.)
2. Is free communication of questions and ideas about such a program possible and encouraged between classroom teachers and administrative officers?
3. Is a long-range planning program set up to take care of present and future needs in relation to equipment, materials, curriculum integration, community resources and facilities, and in-service training?
4. Are inter- and intra-school faculty meetings so organized that the role of audio-visual materials in education is periodically considered?
5. Does the administrative leadership coördinate, share, and distribute information about audio-visual education to the staff by means of staff publications, service pamphlets or bulletins, or information about sources, such as films and books, which is scheduled for circulation among the staff or deposited in individual schools for staff reference and use?

The following films are representative:

Accent on Learning, Sound, B&W, 28 min., Ohio State University.
Bring the World to the Classroom, Sound, B&W, 20 min., Encyclopædia Britannica Films.
Children's Emotions, Sound, B&W, 21 min., McGraw-Hill.
Film Tactics, Sound, B&W, 22 min., Castle Films.
Instructional Films—The New Way to Greater Education, Sound, B&W, 25 min., Coronet.
Learning Through Cooperative Planning, Sound, B&W, 18 min., Columbia University.
Learning to Understand Children: Part I—A Diagnostic Approach, Sound,

B&W, 21 min.; *Part II—A Remedial Program,* Sound, B&W, 23 min., McGraw-Hill.

Principles of Development, Sound, B&W, 16 min., McGraw-Hill.

Problem of Pupil Adjustment: The Drop-Out, Sound, B&W, 18 min.; *The Stay-In,* Sound, B&W, 19 min., McGraw-Hill.

Social Development, Sound, B&W, 16 min., McGraw-Hill.

Teaching with Sound Films, Sound, B&W, 11 min., Encyclopædia Britannica Films.

Using the Classroom Film, Sound, B&W, 22 min., Encyclopædia Britannica Films.

Who Will Teach Your Child? Sound, B&W, 23 min., McGraw-Hill.

The following books and periodicals are representative:

Ahl, Frances N., *Audio-Visual Materials in the High School,* Christopher Publishing House, Boston, 1946.

Dale, Edgar, *Audio-Visual Methods in Teaching,* Dryden Press, New York, 1946.

De Bernardis, Amo, *The Audio-Visual Projectionist's Handbook,* Audio-Visual Publishers, Chicago, 1949.

Dent, Ellsworth C., *The Audio-Visual Handbook,* Society for Visual Education, Chicago, 1949.

Educational Screen, Chicago.

Falconer, Vera M., *Filmstrips,* McGraw-Hill, New York, 1948.

Haas, Kenneth B., and Packer, Harry Q., *The Preparation and Use of Visual Aids,* Prentice-Hall, New York, 1947.

Hoban, Charles F., Hoban, Charles F., Jr., and Zisman, Samuel B., *Visualizing the Curriculum,* Dryden Press, New York, 1946.

Kinder, James S., *Audio-Visual Materials and Techniques,* American Book, New York, 1950.

McKown, Harry C., and Roberts, Alvin B., *Audio-Visual Aids to Instruction,* McGraw-Hill, New York, 1949.

Potter, Gladys L., *Exploring Your Community,* Association for Childhood Education, Washington, 1940.

See and Hear, Chicago.

Weaver, Gilbert G., and Bollinger, Elroy W., *Visual Aids—Their Construction and Use,* Van Nostrand, New York, 1950.

6. Is interschool visitation encouraged so that teachers can observe effective classroom demonstrations of audio-visual techniques?

If the answers to such questions as the above are in the affirmative, a good foundation is being provided upon which to base total formulation of audio-visual procedures. A negative answer to any question is a clear indication of need in that particular area.

Execution is the carrying out of a plan or a design. Hence execution of an audio-visual policy is the carrying out of what it has been decided should be done.

As was said above, in policy formation everyone should have a part. But this is not the case in the execution of policies. It is desirable and necessary in the execution of audio-visual policies that individual responsibility for action should be allocated and exercised. While the administrator must make job assignments, he should do so only after conferences with the individual staff members who are concerned with the outcomes of such assignments.

Execution of an audio-visual policy is a day-by-day process. How can a teacher have reasonably immediate access to a sound projector? How can an audio-visual committee secure books about audio-visual techniques? Where can a teacher get *this* film and *that* filmstrip? How can he be given regular opportunities to preview new audio-visual materials? Where can he "see" the best procedures for the intelligent and effective utilization of new audio-visual materials in a given subject area?

Questions such as these are concerned with action, not with planning. Execution is thus the stage at which thoughtful planning is put into practice.

Good as the planning of policy may be, nothing can actually be accomplished in improving instructional procedures until the various policies are put into action. The action stage of policy formation occurs only when the actual execution of these plans becomes an accomplished fact. It is the responsibility of the administration to see that the execution of policies which are unquestionably useful becomes an accomplished fact.

In order to judge how well the execution of an audio-visual program is progressing, such questions as those suggested above for the teacher will be found of value by the administrator (see pages 506 ff.). To repeat: The test of a functioning audio-visual program is the classroom use of audio-visual materials and equipment. Therefore, the teacher's concern with preview and evaluation is also the administrator's. Similarly, the fact that an opaque projector, for example, is or is not available to a teacher at the exact time that the class can profit from it is the administrator's concern as well as the teacher's. It is for this reason that administrators must answer the same questions as the teacher, and must answer them in terms of the entire school system.

Additional questions which pertain more directly to the administrator are as follows:

1. Are audio-visual methods offered reasonably frequently in in-service training programs? Do they include such matters as:
    a. Operation of projection equipment.
    b. Operation of audio and recording equipment.
    c. Regularly scheduled previewing of material.
    d. Evaluation and selection of teaching materials.
    e. Effective use of teaching materials in the classroom.
    f. Progress reports on new teaching materials and equipment.
    g. Study and cataloguing of community resources for the purpose of field trips, etc.
2. Has the cost of an effective audio-visual program been made known to the board of education? Have the necessary funds been provided?
3. Are audio-visual policy and planning recommendations matched by budgetary provisions insofar as the resources of the community allow?

Once the policies have been created and specific plans made for their implementation, it is the responsibility of the administrator to recommend to the school board that adequate money be set aside to finance the program. The per-pupil cost of an audio-visual program including materials and equipment varies from coast to coast, but is generally higher in the West.[4] The costs should include: (1) supervisors' salaries—whole or part-time, depending on the size of the system; (2) the cost of materials, whether they are rented or purchased, depending on the size of the system; and (3) equipment costs.[5]

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[4] "We Are Today Spending," *See and Hear,* January, 1950, p. 28.

[5] The basic equipment needs of the modern teacher are enumerated by Helen Seaton as follows:

"a. Acoustics
"b. Lighting
"c. Electrical outlets
"d. Ventilation
"e. Darkening facilities
"f. Storage space
"g. Workshop space
"h. Flexibility of design to permit use of new aids and development of new techniques of use."

The units of each type of equipment required will vary with the local school plan and the number of teachers.

Basically a school has adequate equipment only when every teacher is able to use a piece of equipment in his classroom when it is needed to supplement normal instructional procedures.

4. Is the administrator actively encouraging reports to the community regarding the value of audio-visual materials?

   It is the responsibility of the school personnel to inform the community about significant aspects of their work, needs, and progress. More will be said later about reporting techniques (see pages 524 ff.).

Appraisal a Continuing Process

Evaluation is usually the first and most rewarding activity to be engaged in before plans can be made. The above questions for both teacher and administrator will reveal the extent to which a given local school or school system has progressed in executing a program for improving instruction through audio-visual materials.

Although the evaluation of an existing audio-visual program may be made initially to determine its effectiveness, the process of evaluation is by no means limited to a single endeavor. Rather, it is a continuing function; it goes on daily, weekly, year after year. Evaluation can point the way to needed next steps. Constant reference to the questions listed above will reveal additional opportunities for improvement.

After the initial investigation, the next question to arise is: Now that we know where we are, what means can we use to install the kind of program which is felt to be necessary and desirable? There are many ap-

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As the minimum goal in supplying equipment, the same author lists the following:

“a. One 16 mm. sound projector for every 200 students

“b. One filmstrip projector for every 200 students

“c. One 2 x 2 projector for every 400 students

“d. One 3¼ x 4¼ projector for every 400 students

“e. One set of 35 stereoscopes for every 400 students (elementary schools only)

“f. One opaque projector for each school

“g. One table-type radio for each classroom

“h. One two-speed portable 16-in. transcription player (complete with speaker) for each 200 students

“i. One microphone for use with playback or projector for each school

“j. Wall-type screens or suitable projection surface for each classroom.”

See Helen Hardt Seaton, *A Measure for Audio-Visual Programs in Schools*, American Council on Education, Washington, 1944, p. 36.

proaches to this problem, but the best one is perhaps to discuss several techniques for organizing the planning and policy-forming activities of the entire staff.

TECHNIQUES FOR AUDIO-VISUAL PLANNING AND POLICY FORMULATION

Before the processes for formulating educational policy can be discussed, the meaning of the word "policy" must be clearly understood.

Webster defines policy as: "A settled or definite course or method adopted and followed by a government, institution, body, or individual; prudence or wisdom in the management of private affairs; wisdom; sagacity; shrewdness; . . . a stratagem." From these several meanings, it is clear that (1) policy is the process of establishing and having thoroughly understood by all concerned—in this case teacher, supervisor, principal, administrator, and the lay public—*what* is to be done; and (2) having all involved know clearly *who* is to do *what*. The *how* of all that is to be done must also be determined.

Responsibility for Policy Formulation

Who is responsible for the formulation of audio-visual policies? The answer might be "Everybody," for certainly everyone should be concerned. However, it is well known that everybody's business is nobody's business.

The administrative officer of the school should assume basic leadership responsibility in establishing policies which provide for a program of audio-visual instruction. The administrator has authority to marshal all interested sources so that the program is ultimately recognized as being derived from every member of the school system. The entire staff of a local school or school system is obligated to participate in the formulation of policies which affect the instructional program. Policies relating to audio-visual instruction should include materials, equipment, physical facilities, funds, professional improvement, and other closely allied problems.

Policy Formulation in Action

Once a teacher realizes that he is expected to take part in policy formulation, he seizes upon this new concept of democratic administrative procedure with avidity. A strong partnership between teaching staff and administration tends to be produced.

From this partnership may accrue many advantages, the greatest of which is a strong feeling of mutual responsibility for an improved school program. The coöperative formulation of policies by staff and administration must give way to speculation about audio-visual instruction and its techniques, its many aspects and its relationships to interest and sense of accomplishment on the part of the pupils, all of them factors that will ultimately influence the final judgment of the planners. The administrator will have his ideas tested by "classroom wisdom"; the teacher will experience the reverse process.

Of the many policy-forming procedures that exist, the following will be described: (1) the audio-visual building committee, (2) the school system audio-visual planning committee, (3) the audio-visual status survey, (4) the curriculum committee, and (5) planned professional study.

1. Teachers who naturally are interested in audio-visual techniques for improving instruction might well become core members of a *building committee*. Professionally interested teachers may wish to study the effectiveness of their own teaching. In this case, the administrator's role is to assist them to gain access to professional reading material, current audio-visual materials for preview, and demonstration equipment.

A typical building committee activity is reported by the principal of the Whitefish Bay, Wisconsin, public schools. The teachers there felt that a study of how audio-visual techniques could improve instruction would be valuable. Some teachers were more interested than others. It was only natural that an audio-visual building committee, including the principal and representative faculty members, was formed. This committee was given complete authority to investigate and to plan. Their work resulted in the following suggested plans:

a. Teachers should meet to preview and select new audio-visual materials.
b. Preview and selection should be based on how new audio-visual materials may be correlated with and improve existing course-of-study plans.
c. Recommended audio-visual materials should be secured by the ad-

ministration for interested teachers and pupils (through either rental or purchase).

d. Teachers should not use audio-visual materials in instruction unless they have become well acquainted with them through examination, study, or preview.

e. Teachers should use audio-visual materials in true "study" situations.

f. Audio-visual equipment should be easily accessible to teachers.

g. Classrooms should be so equipped as to make possible ready and effective use of audio-visual materials.

Once policies have been established, they should not be followed time without end; rather, they should be reëxamined periodically. Continual scrutiny of existing policies should be encouraged, and suggested changes should be tested before being finally rejected or accepted.

2. If it is desirable for supervisors, principals, and teachers within a single school to work together in developing policies for effective classroom procedures based on audio-visual techniques, large school systems can accomplish the same results by means of an *audio-visual planning committee.* In school systems with larger teaching staffs it may be desirable to have policy-formation activities carried on by such a committee, composed of representatives of the various grades and subject areas of the school system as a whole.

3. The *audio-visual status survey* enables the administrator, working through an all-school policy committee, to study the status of an existing audio-visual program. Such a survey can be based on all or some of the questions listed in this chapter.

4. It is not necessary to set up a new committee for audio-visual program planning. As has been said previously, there is no field of audio-visual instruction *per se;* rather it is an inherent part of curriculum planning and implementation. Hence the orderly contemplation of the role of audio-visual techniques in improving instruction is a curriculum responsibility that can well be assumed by the *curriculum committee.*

There are few school systems today in which a curriculum committee does not exist. Since the role of audio-visual techniques is an expression of the implementation of curriculum responsibility, it follows logically that existing curriculum committees should assume the next stage of responsibility, namely, investigation of the audio-visual materials and techniques that can bring about a more realistic understanding of the objectives encompassed in the curriculum.

Just as the curriculum committees seek to define what pupil experiences should be included in the sequential plans that are then called curriculum, so they may proceed to the next step, coördinating the audio-visual materials and techniques with curriculum objectives.

It is reasonable to expect that the curriculum committee on primary reading will be completely informed regarding the newest audio-visual materials which will then become an integral part of reading comprehension.[6] Any curriculum manual or course of study invariably contains lists of supplementary and basic readers. Today no curriculum implementation plan is complete that does not refer to transcriptions, filmstrips, 16 mm. sound films, charts, and maps.

5. School or city-wide audio-visual planning committees have several resource avenues at their disposal. Certainly the first of these is *planned professional study* embodied in the combined subjective judgments of skilled teachers. The opinion of a successful teacher can be of great value to a committee that is contemplating policies for an audio-visual instructional program. These teacher committees should have access to the literature on the subject both in printed form and in the form of 16 mm. sound films (see pages 511–512).

TECHNIQUES FOR ADMINISTERING AN AUDIO-VISUAL PROGRAM

The formulation of audio-visual plans should be a joint staff endeavor. The result of this action is a plan for the evaluation, selection, and use of audio-visual materials for improving instruction. Such a plan, if democratically arrived at, is a consensus of what is needed and desired by the school personnel. It is then the responsibility of the administration to see that such a plan is put into operation.

Unlike planning, execution is an individual responsibility. The execution of audio-visual plans should be determined by the administrator, and only he should assign the duties, activities, or functions connected therewith.

In a small school, the administrator himself may, for budgetary or other reasons, assume responsibility for the execution of the audio-visual plan.

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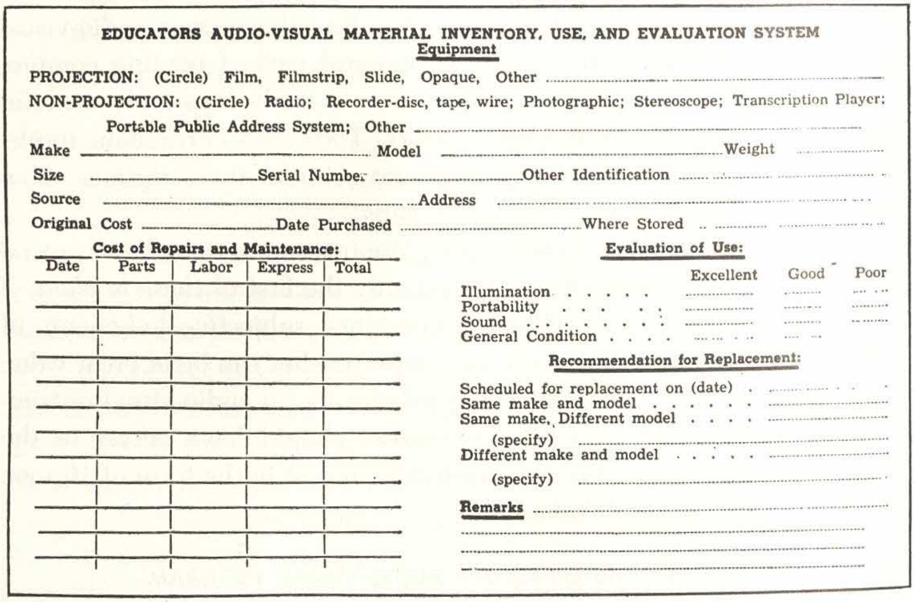
[6] *It's Fun to Find Out* (Film-Story Books), Heath, Chicago; coördinated with Encyclopædia Britannica Films.

In this case it will fortunately or unfortunately have to compete with other responsibilities for whatever attention a busy superintendent or supervising principal can give it. Such an administrator may be highly interested in an audio-visual program but may not ever completely realize it because of the many demands on his time.[7] Figs. 17.2 and 17.3 show two of the forms used in a suggested system for administering an audio-visual program in a small school. A form evaluating slidefilms and one for evaluating slides, maps, etc., are almost identical to that in Fig. 17.3.



EDUCATORS AUDIO-VISUAL MATERIAL INVENTORY, USE, AND EVALUATION SYSTEM

Equipment

PROJECTION: (Circle) Film, Filmstrip, Slide, Opaque, Other

NON-PROJECTION: (Circle) Radio; Recorder-disc, tape, wire; Photographic; Stereoscope; Transcription Player; Portable Public Address System; Other

Make Model Weight

Size Serial Number Other Identification

Source Address

Original Cost Date Purchased Where Stored

Cost of Repairs and Maintenance:

Date	Parts	Labor	Express	Total

Evaluation of Use:

	Excellent	Good	Poor
Illumination			
Portability			
Sound			
General Condition			

Recommendation for Replacement:

Scheduled for replacement on (date)

Same make and model

Same make, Different model

(specify)

Different make and model

(specify)

Remarks

Fig. 17.2. Inventory, use, and evaluation form for audio-visual equipment. (This and Fig. 17.3. courtesy of Educators Progress Service.)

Administrative duties and functions may be assigned to an audio-visual teacher-director, a building audio-visual committee, or an audio-visual director (full or part-time depending on circumstances).

The Audio-Visual Teacher-Director

Interest in audio-visual techniques and methods may be the single most important reason for selecting a teacher to work in a given school.

As the teaching staff carries out its day-to-day assignments, it is inevitable that over a period of time new interests will develop, new abilities come to light, and therefore a change in assignment will be desired by given individuals. Administrators and teachers alike should recognize such shifts in interests and capacities; and to the degree that it is feasible, work should be reassigned where this seems likely to increase the utilization of the capacities of the staff.

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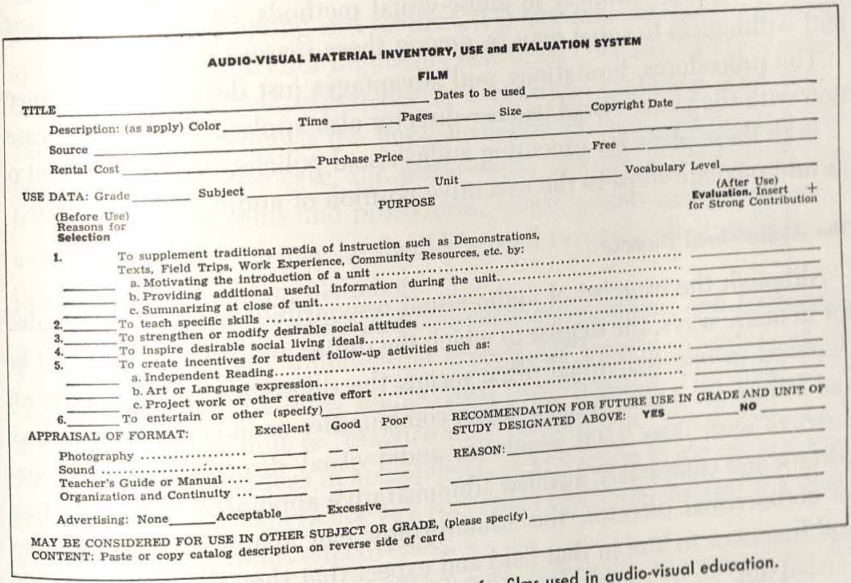
[7] See *An Audio-Visual Materials Inventory, Use and Evaluation System,* Educator's Progress Service, Randolph, Wis.



AUDIO-VISUAL MATERIAL INVENTORY, USE and EVALUATION SYSTEM

FILM

TITLE _____ Dates to be used _____

Description: (as apply) Color _____ Time _____ Pages _____ Size _____ Copyright Date _____

Source _____ Free _____

Rental Cost _____ Purchase Price _____ Vocabulary Level _____

USE DATA: Grade _____ Subject _____ Unit _____

(Before Use) Reasons for **Selection**

PURPOSE

(After Use) **Evaluation.** Insert + for Strong Contribution

1. To supplement traditional media of instruction such as Demonstrations, Texts, Field Trips, Work Experience, Community Resources, etc. by: .... _____
   - _____ a. Motivating the introduction of a unit .... _____
   - _____ b. Providing additional useful information during the unit.......... _____
   - _____ c. Summarizing at close of unit.......... _____
2. _____ To teach specific skills .... _____
3. _____ To strengthen or modify desirable social attitudes .... _____
4. _____ To inspire desirable social living ideals.......... _____
5. To create incentives for student follow-up activities such as: .... _____
   - _____ a. Independent Reading.......... _____
   - _____ b. Art or Language expression.......... _____
   - _____ c. Project work or other creative effort .... _____
6. _____ To entertain or other (specify) _____

APPRAISAL OF FORMAT:

	Excellent	Good	Poor
Photography			
Sound			
Teacher's Guide or Manual			
Organization and Continuity			

Advertising: None _____ Acceptable _____ Excessive _____

RECOMMENDATION FOR FUTURE USE IN GRADE AND UNIT OF STUDY DESIGNATED ABOVE: **YES** _____ **NO** _____

REASON: _____

MAY BE CONSIDERED FOR USE IN OTHER SUBJECT OR GRADE, (please specify) _____

CONTENT: Paste or copy catalog description on reverse side of card

Fig. 17.3. Inventory, use, and evaluation form for films used in audio-visual education.

A teacher who is given audio-visual duties certainly should have his total teaching load modified accordingly. Time is necessary for the many duties involved in executing audio-visual plans. A curtailed teaching schedule is usually the best way of balancing the overall load of an audio-visual teacher-director.

The position of teacher-director offers many advantages for audio-visual plans. It is the first step in executing a specific audio-visual program, and it usually can be created without major budgetary changes.

The teacher-director often possesses many qualifications that are desirable in one who has audio-visual duties. Among them are (1) interest in audio-visual methods; (2) successful teaching experience; (3) knowledge of curriculum and of curriculum planning and revision; (4) knowledge of the problems confronting the teacher who attempts to implement the curriculum with realistic and meaningful audio-visual learning; and

(5) appreciation of the role of audio-visual methods in the improvement of instruction *per se*.

The Building Audio-Visual Committee

In any school there may be reasons why audio-visual duties may be assigned to a small committee of interested teachers rather than to an individual teacher. Interest in audio-visual methods, success in teaching, and willingness to serve may be among these reasons.

The procedures, limitations, and advantages just described in connection with the audio-visual teacher-director also apply in the present case.

Both these plans for executing audio-visual policies may be thought of as intermediate steps to the executive position of audio-visual director.

The Audio-Visual Director

Although the exercise of audio-visual responsibilities can be provided for in many ways, the degree to which the duties and functions should be centered in one individual often means the difference between success and failure for a program. In urban communities or in centralized school districts with over 1500 pupils an audio-visual director seems an important and completely justified administrative appointee. On appointing an audio-visual director, the administrator can assign executive duties and functions to him in that field and expect that they will be effectively carried out.

The audio-visual director must be a combination of outstanding teacher, curriculum worker, subject supervisor, and general administrator. Above all, he must have as the center of his interest an abiding faith in the desirability of working side by side with interested teachers in furthering an understanding of the role of audio-visual materials and equipment in improving instruction and the classroom environment.

Among the specific qualifications which the director should possess are:

1. *Successful experience in classroom teaching.* In order to understand the problems confronting the classroom teacher who is desirous of making curriculum units meaningful to pupils, the audio-visual director should have had successful classroom teaching experience himself.

2. *Professional training in audio-visual methods, supervision, and administration.* Only through adequate training in audio-visual methods can a director keep abreast of the new materials, equipment, and techniques

which are being developed from day to day in this frontier field. His responsibility calls for him to continue professional training, reading, and research investigations preferably within his own school system.

3. *Competence in curriculum planning and its philosophy.* The audio-visual director should be experienced in curriculum planning and implementation. Since the whole range of audio-visual methods is interwoven into curriculum planning and revision, it is unthinkable that the man who assumes responsibility for improving instruction has not had professional training and practical experience in curriculum planning. The field of audio-visual education is the implementation phase of curriculum planning. This being the case, the audio-visual director is continually confronted with problems and procedures, investigations and techniques of a curricular nature; hence he should be well versed in the principles and practices of curriculum planning.

4. *Ability to demonstrate audio-visual theories, plans, and techniques.* Too many self-styled audio-visual experts are merely operators of mechanical gadgets and other audio-visual paraphernalia. The audio-visual director should be able to "practice what he preaches." He should be able to demonstrate his ideas in actual teaching situations in almost any classroom. Here again, experience as a successful classroom teacher is a necessary prerequisite to his effectiveness.

5. *Continual professional contact with colleagues in connection with curriculum, teaching methods, and audio-visual education.* The audio-visual director must seek to be a constant contributor to the literature on audio-visual education and a participant in regional, state, and national programs.

6. *Ability to work well with lay people and with teachers, fellow supervisors, and administrators.* The director must be able to see the essential aspects of the audio-visual program in relation to all the other facets of the many-sided school curriculum.

The director's first responsibility is to assist the teacher to become more familiar with evaluating, selecting, and using audio-visual materials for improving the day-to-day learning environment he seeks to provide for his pupils. Administratively, the director may delegate interested teachers in the building to form a secondary core of supervisor-teachers; they may be called building representative, school representative, etc. This type of secondary organization is only a mechanical expedient.

The audio-visual director has many other responsibilities, including the following:

1. To help teachers realize the reasons for and the techniques required in previewing and evaluating current audio-visual materials.
2. To assist teachers in defining problems of instruction and in discovering ways of meeting them through audio-visual materials and techniques.
3. To act as general information center so that the teachers will know whom to ask about problems concerning utilization, availability of materials, operation of equipment, etc. This function is often best served by a comprehensive program of in-service training which includes faculty meetings, work-study groups of teachers, and formally organized credit courses in audio-visual methods.
4. To acquaint his teaching staff with the newest developments in the field, such as new materials, new equipment, research findings, etc.
5. To foster interschool visits by teachers.
6. To advise the administration concerning needed audio-visual materials and equipment (and their estimated costs).

Only as the audio-visual director is successful in working closely with teachers, fellow supervisors, and administrators will he fulfill the specific duties and functions which the administrator has seen fit to assign to him. No director should ever lose sight of the fact that his job is never done, that new problems, new challenges are always ahead. His is the task of continually searching for means of improving instruction and for the more orderly revision and organization of curriculum responsibilities.

REPORTING TO THE COMMUNITY

"The schools have surely changed. Why when I went to school . . ."

This often-heard remark reveals that when adults think about the schools of today, they are actually recalling their last realistic acquaintance with school—the one they attended years ago.[8] It is logical to expect, then, that the average adult, out of school for twenty years, will have little information about the school of today—its curriculum, instructional methods, etc.

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[8] See R. W. Bardwell, *Measuring Lay Attitudes Toward Public Education,* thesis, University of Wisconsin, 1939. This interpretation is based on a questionnaire one part of which asks, "Does your belief in regard to public schools come from (check as many as you believe apply and then list these) your own experiences, your schools, your child's school experience, observing the schools, reading about the schools, talking about the schools, employing school graduates?"

What must be the average lay person's reaction when he hears about audio-visual techniques of instruction as they relate to contemporary school programs? How does he interpret the terms "visual education," "audio-visual instruction," "school films," "filmstrips," "transcriptions," "models," etc.?

Systematically communicating to the lay public information about the school program is the responsibility first of the school administrator, supervisor, and teacher, and second of the other community agencies that are the avenues through which information is ordinarily disseminated—television, radio, and the press.

The graphic nature of audio-visual teaching materials and techniques makes reporting accomplishments in this field an interesting, easily explained kind of information to be brought to the attention of community groups. Among the several avenues open to the teacher, supervisor, or administrator for describing audio-visual materials and methods to the community are special educational celebrations, Congress of Parents and Teachers programs, school staff reports, and the superintendent's annual report of school activities.

Special Educational Celebrations

The most universally observed opportunity for bringing the public into the schools is American Education Week which occurs each November. In line with the themes chosen for observation during this week, carefully chosen audio-visual materials may be used as part of the program.

As an example of how an administrator, a building coördinator, and a teacher may work in coöperation with local groups planning for American Education Week, the following 16 mm. sound motion pictures are suggested as suitable for a typical program. Such films as these can be used to help develop the themes chosen daily during a typical observance. The films can be shown independently or, better still, they can be made the basis for group discussions of the various themes. These film-discussion programs can be used in conjunction with American Education Week observances by Parent-Teacher Associations, American Legion posts, women's clubs, and service clubs.[9]

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[9] See Robert Schacht, *How to Conduct a Community Film Forum*, Film Council of America, Chicago, 1949.

THEME—LEARNING TO LIVE TOGETHER

Americans All, Sound, B&W, 16 min., March of Time.
Boundary Lines, Sound, Color, 10 Min., International Film Foundation.
Brotherhood of Man, Sound, B&W, 10 min., Brandon Films.
Challenge, Sound, B&W, 30 min., March of Time.
Democracy and *Despotism,* Sound, B&W, 10 min. each, Encyclopædia Britannica Films.
High Wall, Sound, B&W, 31 min., McGraw-Hill.
House I Live in, Sound, B&W, 10 min., Teaching Film Custodians.
Man—One Family, Sound, B&W, 17 min., Film Publishers.
Whoever You Are, Sound, B&W, 20 min., Award Films.

THEME—IMPROVING THE EDUCATIONAL PROGRAM

Better Schools for Rural Wisconsin, Sound, Color, 29 min., University of Wisconsin.
Bring the World to the Classroom, Sound, B&W, 20 min., Encyclopædia Britannica Films.
Broader Concepts of Method, Sound, B&W, 19 min., McGraw-Hill.
Children Growing Up With Other People, Sound, B&W, 24 min., United World Films.
Children Learning by Experience, Sound, B&W, 30 min., United World Films.
Counseling, Its Tools and Techniques, Sound, B&W, 20 min., Carl Mahnke Productions.
Drop-Out and *Stay-In,* Sound, B&W, 18 min. each, McGraw-Hill.
Instructional Films—The New Way to Greater Education, Sound, B&W, 27 min., Coronet.
Learning to Understand Children, Sound, B&W, 23 min., McGraw-Hill.
Lessons in Living, Sound, B&W, 22 min., Brandon Films.
Maintaining Classroom Discipline, Sound, B&W, 14 min., McGraw-Hill.
Near Home, Sound, B&W, 20 min., British Information Services.
Report on Donald, Sound, B&W, 20 min., University of Minnesota.

THEME—SAFEGUARDING OUR AMERICA

Communism, Sound, B&W, 32 min., Castle Films.
Democracy and *Despotism,* Sound, B&W, 10 min. each, Encyclopædia Britannica Films.
Flag Speaks, Sound, Color, 20 min., Teaching Film Custodians.
Hometown, U.S.A., Sound, Color, 22 min., Look Magazine.
Living Earth Series, Sound, Color, 45 min., Encyclopædia Britannica Films.
One World or None, Sound, B&W, 9 min., Film Publishers.
Our Bill of Rights, Sound, B&W, 21 min., United World Films.
Our Constitution, Sound, B&W, 21 min., Eastin Pictures.

World Affairs Are Your Affairs, Sound, B&W, 24 min., Encyclopædia Britannica Films.

THEME—PROMOTING HEALTH AND SAFETY

Defense Against Invasion, Sound, Color, 11 min., United World.
Emotional Health, Sound, B&W, 21 min., McGraw-Hill.
Families First, Sound, B&W, 15 min., New York State Youth Commission.
Magic Alphabet, Sound, B&W, 11 min., Teaching Film Custodians.
Passport to Health, Sound, B&W, 20 min., Sharpe and Dohme.
School That Learned to Eat, Sound, Color, 22 min., General Mills.
What's on Your Mind? Sound, B&W, 10 min., National Film Board of Canada.
You Bet Your Life, Sound, B&W, 10 min., Progressive Pictures.

American Education Week offers an opportunity to project or display representative audio-visual materials chosen from those actually used by children in the classroom in their normal work during that week. To show adult groups some of the filmstrips, slides, films, and other audio-visual materials which are being used in the social studies, science, mathematics, language arts, commercial subjects, industrial arts, or other subject areas is an extremely realistic way of demonstrating what modern audio-visual materials are like and what they can accomplish.

Choosing a representative 10-minute teaching film from each of two or three subject areas in which large numbers of the children are enrolled, and showing a cross section of such films to a community group will help the public realize the worth of one phase of an audio-visual program. A 30-minute selection of representative films used in the social studies, science (biology, chemistry, or physics), mathematics, etc., can be based on the films listed on pages 364–376.

Short reports by teachers on the use of maps, charts, globes, films, filmstrips, slides, models, specimens, books, tackboards, and chalkboards to improve instruction will further inform the community of the nature of the audio-visual teaching materials used in our schools.

Congress of Parents and Teachers Programs

Using audio-visual materials in the educational programs of the National Congress of Parents and Teachers is another possibility for bringing carefully selected teaching materials to the attention of adult groups. In state and local Parent-Teacher Associations a number of standing committees are elected annually. These committees include health and safety, motion pictures and visual education, social hygiene, world citizenship, recreation, radio, reading and library service, etc. It is usually the responsibility of the chairman of each of these committees to plan part or all of one regular P.T.A. program that will report on the school's health, recreation, and other activities.

Here the school person can be of assistance. Suppose that the chairman of the world citizenship committee is responsible for reporting school activity in this area before a P.T.A. meeting. Would it not be desirable to show the group the audio-visual materials actually used in social studies classes when problems of world citizenship are being studied? Such films as those that are listed on pages 368 ff. might be used as part of such a program.

Similarly, during a P.T.A. meeting on school and home health problems, the report of the chairman of the standing committee on child health and welfare might include the audio-visual materials used in regular school work, such as the following films:

Body Care and Grooming, Sound, B&W, 17 min., McGraw-Hill.
Care of the Skin, Sound, B&W, 10 min., Encyclopædia Britannica Films.
Human Growth, Sound, Color, 19 min., University of Oregon.
Human Reproduction, Sound, B&W, 22 min., McGraw-Hill.
Johnny Learns His Manners, Sound, B&W, 20 min., Pictorial Films.
The Other Fellow's Feelings, Sound, B&W, 10 min., Young America Films.
Your Teeth, Sound, B&W, 10 min., Young America Films.

Similar use of audio-visual materials can be suggested to other standing committee chairmen in the city or local P.T.A.

The opportunity of reporting on school-wide use of audio-visual materials falls naturally to the chairman of the P.T.A. standing committee on motion pictures and visual education.

School Staff Reports

An effective way to report the use of audio-visual materials to the community is through actual classroom demonstrations. For a teacher and his pupils to present a typical lesson in which audio-visual materials are used gives as vivid and understandable an account of school methods as any that can be presented to adult groups.

A typical lesson in some subject area such as the social studies, science, mathematics, or language arts will do more to acquaint an audience with the role of audio-visual materials in the school today than hours of talk. The opportunity of seeing for themselves how pupils acquire information and understanding through the use of modern teaching tools is in itself an audio-visual experience for adults.

Actual classroom teaching demonstrations which reveal the all-round contribution of audio-visual materials to learning can be a realistic and valuable report to parents and other lay community groups.

The Superintendent's Annual Report

The superintendent's annual report on school activities offers a natural opportunity for comment on the present status of audio-visual materials and equipment, and plans for future developments in this field. By means of well-worded explanations and representative pictures of these materials in use, the current audio-visual program can be described and additional facilities which may be needed can be recommended.

The annual report of the Glencoe, Illinois, public schools is unique because of the manner employed in its presentation:

> In Glencoe an annual program is devoted to reporting the scope of educational progress during the current year. This is done on a demonstration basis. As the community comes in to witness the reporting which is done at the annual meeting, the student audio-visual school service club demonstrates how multi-sensory materials are actually used in action. The students themselves run the "show" with a supervisor serving as a master of ceremonies. Equipment used in the school is set up on the stage of the auditorium. The function of each piece of equipment is demonstrated by the students, and representative materials are projected or audited so that parents can see actually what specimen materials are like as they are used to accomplish course-of-study objectives.
>
> A demonstration may include materials used in studying Mexico, an account of an eighth-grade social studies field trip, the use of filmstrips in teaching posture in physical education, the display of slides actually made by students which assist in the teaching of commercial subjects, opaque projection of materials used in reading readiness, the demonstration and use of wire and disc recording by seventh-grade social studies children, a display of a well-conceived bulletinboard showing pictures that teach—pictures which have been gathered by students, mounted and prepared as exhibits to go along with a unit of work in progress.[10]

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[10] This report illustrates the work of John Sternig, the supervisor of audio-visual instruction.

The Responsibility for Continuing Audio-Visual Reports

Because the process of education is of great concern to the American public and because that public has placed such continuing faith in the American system of education, it is the responsibility of professional school people periodically and systematically to report the techniques, aims, and procedures of the American school to the public it serves.

Because of this responsibility, persons interested in audio-visual education should assume their full share of responsibility for reporting systematically to the community the status of the work in this field and the progress that is being made in improving teaching techniques through the wise use of carefully selected audio-visual materials and equipment.

Because of the extensive work involved in establishing an audio-visual program, it is easy to overlook the continuing responsibility for reporting on progress in this new and growing field. Since the entire field is becoming so firmly ingrained in the subject content of education from elementary school through to the adult level, the responsibility for reporting the current status, progress, and future needs can no longer be overlooked.

It is the responsibility of everyone concerned with audio-visual education to use one or all of the reporting techniques mentioned here, and to devise others which will be even more specifically adapted to the local school situation.

SUMMARY

The administration of an audio-visual program calls for many activities. Among them are the formation of a policy or plan, the assignment of definite responsibility for its execution, its actual execution, and the responsibility for reporting progress to the instructional staff and the community.

There is no beginning or end to the many activities involved in planning and administering an audio-visual program. Rather, all the activities proceed simultaneously and necessarily continuously.

The beginning may be an appraisal of the current audio-visual program of instruction. In this appraisal the activities and responsibilities of the teacher, the supervisor, the administrator, the school board, and the community itself should be analyzed. Following the appraisal, possibilities for improvement should be studied by the entire school staff.

In the formulation of audio-visual policy everyone on the staff should take part. Once the policy has been formulated, definite assignments of responsibilities should be made. Specific responsibilities may be assigned to teacher-directors, to members of an audio-visual committee, or, what is most effective, to an audio-visual director.

After the audio-visual program is in operation and the new plans have been carried out, study, appraisal, and revision of plans should go forward continuously.

Both teacher and pupils should participate in the continuing evaluation, selection, and utilization of such teaching materials as films, filmstrips, maps, charts, globes, recordings, models, tape recordings, etc.

Because pupil activities are tangible evidence of the effectiveness of an audio-visual program of instruction, such activities should be continually studied and, most important, reported to the community.

The final accomplishment of the audio-visual program can be judged by the activities that take place in the actual classroom under the direction of a skillful teacher. The effectiveness of such a program can be measured in terms of its ability to present an interesting, vivid, and realistic series of socially important learning experiences to the pupil.

Suggested Activities

1. Use the teacher appraisal questions on pages 506 ff. as the basis for an interview with a teacher in a nearby school. Record reactions to the various questions. Following the interview, report your judgment on such matters as:
   a. The part the teacher plays in helping to formulate audio-visual policy in his school.
   b. Methods of evaluating, selecting, and securing audio-visual materials for use.
   c. Methods of using these materials in the classroom.
   d. Accessibility of audio-visual equipment for classroom use.
   e. Physical facilities including seating, ventilation, acoustics, etc.
2. Interview the local school superintendent or building principal, using appropriate questions from those on pages 517 ff. as a possible basis for your interview. Report your reactions about:
   a. The budget for audio-visual materials and equipment.
   b. Methods used for the selection, acquisition, and use of these materials.
   c. Relationship of the board of education to the audio-visual program.

   - d. Administration of the audio-visual program in its day-to-day operation.
   - e. Audio-visual planning procedures of the entire staff.
3. Interview several parents, neighbors, or businessmen. Ask such questions as these:
   - a. How recently have you listened to or read something which reported on local school activities?
   - b. What do such terms as these mean to you: "audio-visual instruction," "instructional motion-picture films," "filmstrips," etc.?
   - c. In your opinion, what are the real contributions of the audio-visual program to the local schools? Its weaknesses?

   Study your interview reports and interpret the implications of the reactions. Are these people well informed about their school system's audio-visual program? What needs are reflected?
4. As a member of a committee, undertake a simple survey of nearby school systems that are comparable to your own local system. Address your inquiry, either personal interview or letter, to the superintendent. Keep your questions few, direct, and simple. Here are some suggestions:
   - a. How many pupils in average daily attendance?
   - b. How many teachers are employed?
   - c. How many films were purchased last year?
   - d. How many films were rented last year?
   - e. How many 16 mm. sound projectors are owned?
   - f. How many opaque projectors are owned?
   - g. Who selects films used in regular classroom work?
   - h. Who administers the audio-visual program?
   - i. What amount is budgeted for audio-visual materials and equipment costs per year?

   Study your returns and discuss the relative strengths and weaknesses of the audio-visual programs in these several school systems.
5. As a member of a committee, investigate the titles in the following bibliography. Report noteworthy ideas and information to your classmates.

Bibliography

An Audio-Visual Materials Inventory, Use and Evaluation System, Educator's Progress Service, Randolph, Wis.

Bardwell, R. W., *Measuring Lay Attitudes Toward Public Education,* thesis, University of Wisconsin, 1939.

Cartwright, Lloyd J., "The County Film Library, a Nationwide Survey of Current Organization and Operation of County Film Libraries," *See and Hear,* Spring, 1951, p. 19.

Dale, Edgar, *Audio-Visual Methods in Teaching,* Dryden Press, 1946.

It's Fun to Find Out (Film-Story Books), Heath.

Kinder, James S., *Audio-Visual Materials and Techniques,* American Book, 1950.
McKown, Harry C., and Roberts, Alvin B., *Audio-Visual Aids to Instruction,* McGraw-Hill, 1949.
Noel, Francis W., "Principles of Administering Audio-Visual Programs," *48th Yearbook of the National Society for the Study of Education,* 1949, Part I, chap. 10.
Noel, E. G., and Leonard, J. P., *Foundations for Teacher Education in Audio-Visual Instruction,* American Council on Education, 1947.
Reed, Paul, *Using Audio-Visual Materials with Children,* Bulletin of the Association for Childhood Education, Washington, 1947.
Schacht, Robert, *How to Conduct a Community Film Forum,* Film Council of America, Chicago, 1949.
Seaton, Helen Hardt, *A Measure for Audio-Visual Programs in Schools,* American Council on Education, 1944.
"We Are Today Spending," *See and Hear,* January, 1950, p. 28.
Setting Up Your Audio-Visual Education Program, Audio-Visual Education Association of California, 1949.

Source Lists

The following lists are intended to suggest some typical commercial sources of the various audio-visual materials discussed in this book. Numerous other sources such as government agencies, industrial concerns, airlines, railroads, and steamship lines are particularly valuable for flat pictures, posters, graphs, films, and filmstrips.

The exhibit materials list covers special materials that may not be available from art, stationery and school supply stores. Write for catalogues and the names of dealers in your vicinity.

The Educators Progress Service, Randolph, Wisconsin, has a classified list of free illustrative materials including pictures, graphics, films, filmstrips and some exhibit materials.

DISPLAY MATERIALS

Adhesives

Bulletin Board Styx, Adhesive Wax:
  Lea A-V Service, Albert Lea, Minn.
Passe partout, Cellophane Tape, Masking Tape:
  Local art supply and stationery stores.

Cardboard and Paper

Carlo's, 220 Fifth Ave., New York, N.Y.
F. D. Maxwell Corp., 7 W. 36th St., New York, N.Y.
Miller Paper Co., 80 Wooster St., New York, N.Y.
Textkraft Sales Co., 10 E. 33rd St., New York, N.Y.
Local art supply and stationery stores for Bristol board, strawboard, chipboard, construction paper, illustration board, mat board.

Lettering Equipment

Payzant Lettering Pens:
  Keuffel and Esser Co., 520 S. Dearborn St., Chicago, Ill.

Wrico Lettering Stencils and Pens:

    Bulletin Boards and Directory Products, Inc., 724 Broadway, New York, N.Y.
    E. Dietzgen Co., 2425 N. Sheffield Ave., Chicago, Ill.

Letters

Felt and Metal Letters:
    Adler-Jones Co., 521 S. Wabash Ave., Chicago, Ill.
Gummed-Paper Letters:
    Tablet and Ticket Co., 1021 W. Adams St., Chicago, Ill.
Pasteboard Letters:
    Carlo's, 220 Fifth Ave., New York, N.Y.
    Eagle Art Supply Co., 331 W. 42nd St., New York, N.Y.
    Redikut Letter Company, 6519 W. Boulevard, Inglewood, Calif.
Plaster Letters:
    Mitten Display Letter Co., Fifth Ave., Redlands, Calif.
Plastic Letters:
    W. S. Stensgaard & Assoc., 30 Rockefeller Plaza, New York, N.Y.
Wood Letters:
    Manhattan Wood Letter Co., 151 W. 18th St., New York, N.Y.
    New York Wood Letter Co., 18 Green St., New York, N.Y.

Miscellaneous

Drymount Tissue:
    Local stationery and photography stores.
Paper for Continuous-Strip Opaque Projections:
    Picto-Aids Incorporated, Des Moines, Iowa.
Plastic Lamination Material:
    Glassoloid Corporation of America, 130 Summer St., Paterson, N.J.
Sensitized Plastic Sheets:
    Ozalid, Division of General Aniline Corporation, Johnson City, N.Y.

Models

Figures:
    Local toy shops and ten-cent stores.
Foods:
    Chelsea Realistic Products, 807 Avenue of the Americas, New York, N.Y.
    Imitation Food Display Co., 107 Lawrence St., Brooklyn, N.Y.
Miniature Animals:
    Louis Paul Jones, Croton Falls Road, Mahopac, N.Y.

FILMSTRIPS AND SLIDES[1]

American Council on Education, 1785 Massachusetts Ave., N.W., Washington, D.C.
Audio-Visual Guide, 1630 Springfield Ave., Maplewood, N.J.
Central Scientific Company, 1700 Irving Park Road, Chicago, Ill.
Coast Visual Education Co., 5620 Hollywood Blvd., Los Angeles, Calif.
Color Slides Cooperative, McCormick Hall, Princeton, N.J.
Coronet Films, Coronet Building, Chicago, Ill.
Creative Arts Studio, Inc., 1223 Connecticut Ave., N.W., Washington, D.C.
Curriculum Films, 10 E. 40th St., New York, N.Y.
Encyclopædia Britannica Films, Inc., 1150 Wilmette Ave., Wilmette, Ill.
Eye-Gate House, 330 W. 42nd St., New York, N.Y.
General Biological Supply House, 761 E. 69th Place, Chicago, Ill.
Informative Classroom Picture Publishers, 40 Ionia Ave., N.W., Grand Rapids, Mich.
Jam Handy Organization, 2821 E. Grand Blvd., Detroit, Mich.
Key Productions, Inc., Current Affairs Films Division, 18 E. 41st St., New York, N.Y.
Keystone View Company, Hamilton & Crandall St., Meadville, Pa.
Life Magazine, Inc., Filmstrip Division, 9 Rockefeller Plaza, New York, N.Y.
Long Filmslide Service, 944 Regal Road, Berkeley, Calif.
McGraw-Hill Book Co., Inc., Textfilm Dept., 330 W. 42nd St., New York, N.Y.

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[1] There are literally hundreds of sources of filmstrips and slides, both commercial and sponsored. Only the more prominent commercial sources are listed here because of space limitations. More extensive lists will be found in the following publications:

The Complete Index of Educational Filmstrips, Filmstrip Distributors, 2338 E. Johnson St., Madison, Wis., $2.75.
Classified according to subject, grade level, and units of application. Represents 61 major commercial producers.
The Educators Guide to Free Slidefilms, Educators Progress Service, Box 497, Randolph, Wis., $3 annually.
Filmstrip Guide, H. W. Wilson Company, 950–972 University Ave., New York, N.Y., $3 annually.
A cumulative classified index published quarterly.
Vera M. Falconer, *Filmstrips, a Descriptive Index and Users' Guide*, McGraw-Hill Book Company, 330 W. 42nd St., New York, N.Y., 1948, $5.
Classified descriptions of over 3000 filmstrips available on March 15, 1947.

Current releases of new films, filmstrips, and other audio-visual materials are regularly described in such professional periodicals as:

Business Screen, Business Screen Magazines, Inc., 7064 Sheridan Rd., Chicago, Ill.
Kodak News, Eastman Kodak Company, 343 State St., Rochester, N.Y.
Educational Screen, Educational Screen, Inc., 64 E. Lake St., Chicago, Ill.
Film News, Film News, 444 Central Park West, New York, N.Y.
Film World, Ver Halen Publications, 6047 Hollywood Blvd., Hollywood, Calif.
See and Hear, Audio-Visual Publications, Inc., 7064 Sheridan Rd., Chicago, Ill.

National Audubon Society, Photo & Film Dept., 1000 Fifth Ave., New York, N.Y.

New York Times, Office of Educational Activities, 229 W. 43rd St., New York, N.Y.

Philip Photo Visual Service, 1218 American Ave., Long Beach, Calif.

Pictorial Events, 597 Fifth Ave., New York, N.Y.

Popular Science Pub. Co., Audio-Visual Division, 353 Fourth Ave., New York, N.Y.

Projected Books, Inc., 313 N. First St., Ann Arbor, Mich.

Dr. Konrad Prothman, 7 Soper Ave., Baldwin, L.I., N.Y.

Society for Visual Education, Inc., 1345 W. Diversey Parkway, Chicago, Ill.

Stanley Bowmar Co., 513 W. 166th St., New York, N.Y.

Stillfilm, Inc., 171 S. Los Robles, Pasadena, Calif.

U.S. Office of Education, Federal Security Agency, Washington, D.C.

Ward's Natural Science Establishment, Inc., 3000 Ridge Road East, Rochester, N.Y.

Young America Films, 18 E. 41st St., New York, N.Y.

GRAPHICS

See Pictures and Graphics

MOTION-PICTURE FILMS (16 MM.)

Academic Film Company, Inc., 516 Fifth Ave., New York, N.Y.

Academy Films, Box 3088, Hollywood, Calif.

A. F. Films, Inc., 1600 Broadway, New York, N.Y.

Allis-Chalmers Manufacturing Company, Photographic Dept., Tractor Div., Milwaukee, Wis.

American and National Leagues of Professional Baseball Clubs, 64 E. Jackson Blvd., Chicago, Ill.

American Automobile Assn., Traffic Engineering & Safety Dept., Pennsylvania Ave. at 17th St., Washington, D.C.

American Can Company, 100 Park Ave., New York, N.Y.

American Cancer Society, 47 Beaver St., New York, N.Y.

American Film Registry, 24 E. 8th St., Chicago, Ill.

American Film Services, Inc., 1010 Vermont Ave., N.W., Washington, D.C.

American Foot Care Institute, Inc., 1775 Broadway, New York, N.Y.

American Forest Products Industries, 1319–18th St., N.W., Washington, D.C.

American Library Association, 50 E. Huron St., Chicago, Ill.

American Potash Institute, 1155 Sixteenth St., N.W., Washington, D.C.

American Social Hygiene Association, Inc., 1790 Broadway, New York, N.Y.

American Society of Bakery Engineers, Dept. of Visual Education, 208 Third Ave., SE, Minneapolis, Minn.
American Telephone and Telegraph Co., Information Dept., Film & Display Div., 195 Broadway, New York, N.Y.
American Viscose Corporation, 350 Fifth Ave., New York, N.Y.
Anti-Defamation League, 726 Empire Building, Milwaukee, Wis.
Associated Film Artists, 30 N. Raymond Ave., Pasadena, Calif.
Association Films, Inc., 35 W. 45th St., New York, N.Y.
Association of American Railroads, Public Relations Dept., Washington, D.C.
Athena Films, 165 W. 46th St., New York, N.Y.
Athletic Institute, 209 S. State St., Chicago, Ill.
Australian News & Information Bureau, 636 Fifth Ave., New York, N.Y.
Automobile Manufacturers Association, New Center Building, Detroit, Mich.
Avis Films, Inc., 932 N. La Brea, Hollywood, Calif.
Award Films, 381 Fourth Ave., New York, N.Y.
Bailey Films, Inc., 2044 N. Berendo, Hollywood, Calif.
Bakelite Corporation, 300 Madison Ave., New York, N.Y.
Bald Eagle Film Productions, Inc., 104 Howe St. Annex, New Haven, Conn.
C. O. Baptista Films, Sunnyside Ave., Wheaton, Ill.
Arthur Barr Productions, 1265 Bresee Ave., Pasadena, Calif.
Belgian Government Information Center, 639 Fifth Ave., New York, N.Y.
Better Vision Institute, 630 Fifth Ave., New York, N.Y.
Bicycle Institute of America, Inc., 122 E. 42nd St., New York, N.Y.
Boy Scouts of America, Visual Education Service, 2 Park Ave., New York, N.Y.
Brandon Films, Inc., 1700 Broadway, New York, N.Y.
Bray Studios, Inc., 729 Seventh Ave., New York, N.Y.
British Acoustic Films Limited, 142–150 Wardour St., London, England.
British Information Services, 39 S. La Salle St. Chicago, Ill.
Bryon, Inc., Motion Pictures, Studios and Laboratory, 1226 Wisconsin Ave., Washington, D.C.
Business Education Films, 104 W. 61st St., New York, N.Y.
California, University of, Dept. of Visual Instruction, Univ. Extension, 2272 Union St., Berkeley, Calif.
California Centennials Commission, Colton Hall, Monterey, Calif.
California Institute of Technology, Business Mgr., Pasadena, Calif.
Calvin Company, 1105 Truman Road, Kansas City, Mo.
Carnegie Endowment for International Peace, 405 W. 117th St., New York, N.Y.
Castle Films, Division of United World Films, Inc., 1445 Park Ave., New York, N.Y.

Chicago Tribune, Film Bureau, Chicago, Ill.
Children's Productions, P.O. Box 1313, Palo Alto, Calif.
China Film Enterprises of America, Inc., 11 W. 42nd St., New York, N.Y.
Christy Associates, Inc., Old Lyme, Conn.
Churchill-Wexler Film Productions, 137 N. La Brea Ave., Los Angeles, Calif.
Coast Visual Education Company, 6058 Sunset Blvd., Hollywood, Calif.
Cocking, F. W., 4757 Constance Drive, San Diego, Calif.
Columbia University, Film Library, 413 W. 117th St., New York, N.Y.
Commonwealth Pictures Corp., 723 Seventh Ave., New York, N.Y.
Congress of Industrial Organizations, 718 Jackson Place, N.W., Washington, D.C.
Cornell University, Photographic Science Laboratory, Ithaca, N.Y.
Coronet Films, 65 E. South Water St., Chicago, Ill.
Sid Davis Productions, 5608 Clemson St., Los Angeles, Calif.
Deere & Company, Advertising Dept., Moline, Ill.
Dow Chemical Company, Advertising Mgr., Midland, Mich.
Bert Dunne Productions, 57 Post St., San Francisco, Calif.
E. I. du Pont de Nemours & Co., Inc., Motion Picture Distribution, 10th & Market Sts., Wilmington, Del.
Eastin Pictures Company, 707 Putman Building, Davenport, Iowa.
Eastman Kodak Co., Educational Consultant, 343 State St., Rochester, N.Y.
Educational Film Service, 180 N. Union St., Battle Creek, Mich.
Encyclopædia Britannica Films, 1150 Wilmette Ave., Wilmette, Ill.
Ethyl Corporation, 310 S. Michigan Ave., Chicago, Ill.
Evaporated Milk Association, 307 N. Michigan Ave., Chicago, Ill.
Federal Reserve Bank of Minneapolis, Public Services Dept., Minneapolis, Minn.
Film Program Services, 1173 Avenue of the Americas, New York, N.Y.
Film Publishers, Inc., 25 Broad St., New York, N.Y.
Films Incorporated, 64 E. Lake St., Chicago, Ill.
Films of the Nations, Inc., 62 W. 45th St., New York, N.Y.
Firestone Tire & Rubber Company, Dept. of Public Relations, Akron, Ohio.
Flory Films, Inc., 303 E. 71st St., New York, N.Y.
Ford Motor Company, Public Relations, 3000 Schaefer Road, Dearborn, Mich.
Franco-American Audio-Visual Distribution Center, Inc., 934 Fifth Ave., New York, N.Y.
French Films and Folklore, Box 2A, 431 Riverside Drive, New York, N.Y.
Frith Films, 1816 N. Highland Ave., Hollywood, Calif.
William J. Ganz Company, 40 E. 49th St., New York, N.Y.

Gateway Productions, Inc., 1859 Powell St., San Francisco, Calif.
General Electric Co., Promotion Division, 840 S. Canal St., Chicago, Ill.
General Motors Corporation, Film Distribution Section, 3044 W. Grand Blvd., Detroit, Mich.
General Pictures Productions, Inc., 621 Sixth Ave., Des Moines, Iowa.
Georgia Agricultural Extension Service, Audio-Visual Department, Athens, Ga.
Gilbert Paper Company, Menasha, Wis.
Goodyear Tire & Rubber Co., Inc., Motion Picture Dept. Akron, Ohio.
Greater National Capital Committee, Washington Board of Trade, Star Bldg., Washington, D.C.
Hardcastle Films, 818 Olive St., St. Louis, Mo.
Harmon Foundation, Inc., 140 Nassau St., New York, N.Y.
Harvard College Observatory, Cambridge, Mass.
Hawley-Lord, Inc., 61 W. 56th St., New York, N.Y.
Heidenkamp Nature Pictures, 538 Glen Arden Drive, Pittsburgh, Pa.
Paul Hoefler Productions, 7934 Santa Monica Blvd., Los Angeles, Calif.
Hoffberg Productions, Inc., 362 W. 44th St., New York, N.Y.
Hollywood Film Enterprises, Inc., 6060 Sunset Blvd., Hollywood, Calif.
Burton Holmes, 7510 N. Ashland Ave., Chicago, Ill.
Horse Association of America, 407 S. Dearborn St., Chicago, Ill.
John H. Humphrey, 11216 S. Harvard, Los Angeles, Calif.
Hy-Line Poultry Farms, 1206 Mulberry St., Des Moines, Iowa.
Illinois, University of, Visual Aids Service, 713½ S. Wright St., Champaign, Ill.
Indiana University, Audio-Visual Center, Bloomington, Ind.
Institute of Inter-American Affairs, Motion-Picture Project Officer, 499 Pennsylvania Ave., N.W., Washington, D.C.
Institute of Life Insurance, 488 Madison Ave., New York, N.Y.
Institutional Cinema Service, Inc., 1560 Broadway, New York, N.Y.
Instructional Films, Inc., 1123 Central Ave., Wilmette, Ill.
International Brotherhood of Electrical Workers, Chicago Local 1031, Chicago, Ill.
International Cellucotton Products Co., Educational Director, 919 N. Michigan Ave., Chicago, Ill.
International Film Bureau, Inc., 57 E. Jackson Blvd., Chicago, Ill.
International Film Foundation, Inc., 1600 Broadway, New York, N.Y.
International Harvester, 180 N. Michigan Ave., Chicago, Ill.
Iowa, State University of, Extension Division, Iowa City, Iowa.
Iowa State College, Visual Instruction Service, Ames, Iowa.

Irish Linen Guild, 1270 Avenue of the Americas, New York, N.Y.

Jam Handy Organization, 2821 E. Grand Blvd., Detroit, Mich.; and 1775 Broadway, New York, N.Y.

Johnson and Johnson, Director of Promotion, New Brunswick, N.J.

Johnson-Hunt Productions, 6509 De Longpre Ave., Hollywood, Calif.

W. K. Kellogg Foundation, Battle Creek, Mich.

Knowledge Builders, 625 Madison Ave., New York, N.Y.

Kraft Foods Company, 500 Peshtigo Court, Chicago, Ill.

Lederle Laboratories Division, American Cyanamid Company, Film Library, 30 Rockefeller Plaza, New York, N.Y.

Library Films, 25 W. 45th St., New York, N.Y.

Library of Congress, Motion Picture Division, Washington, D.C.

Lincoln Electric Company, 12818 Coit Road, Cleveland, Ohio.

Look Magazine, 511 Fifth Ave., New York, N.Y.

McGraw-Hill Book Company, Text-Film Department, 330 W. 42nd St., New York, N.Y.

March of Time, 369 Lexington Ave., New York, N.Y.

Marshall Field, Chicago, Ill.

Massachusetts Institute of Technology, Div. of Visual Education, 69 Massachusetts Ave., Cambridge, Mass.

Mercer County Schools, Princeton, West Va.

Metropolitan Life Insurance Company, Health and Welfare, 1 Madison Ave., New York, N.Y.

Minnesota, University of, Audio-Visual Extension Service, 230 Northrop Auditorium, Minneapolis, Minn.

Museum of Modern Art Film Library, Circulation Director, 11 W. 53rd St., New York, N.Y.

National Association of Basketball Coaches of the U.S., National Basketball Visual Committee, University of Wisconsin, Madison, Wis.

National Association of Manufacturers, 14 W. 49th St., New York, N.Y.

National Board of Fire Underwriters, Public Relations Dept., 85 John St., New York, N.Y.

National Broadcasting Co., Radio and Television, R.C.A. Building, Radio City, New York, N.Y.

National Conference of Christians and Jews, 759 N. Milwaukee St., Milwaukee, Wis.

National Dairy Council, 111 N. Canal St., Chicago, Ill.

National Fertilizer Association, 616 Investment Building, Washington, D.C.

National Film Board of Canada, 400 W. Madison St. Chicago, Ill.

National Foundation for Infantile Paralysis, Consultant in Health Education, 120 Broadway, New York, N.Y.
National Highway Users Conference, Special Activities Manager, National Press Bldg., Washington, D.C.
National Live Stock & Meat Board, Dept. of Information, 407 S. Dearborn St., Chicago, Ill.
National Music Camp, 303 S. State St., Ann Arbor, Mich.
National Retailers Mutual Insurance Co., 20 N. Wacker Drive, Chicago, Ill.
National Safety Council, 425 N. Michigan Ave., Chicago, Ill.
National Social Welfare Assembly, Inc., 1790 Broadway, New York, N.Y.
National Society for the Prevention of Blindness, 1790 Broadway, New York, N.Y.
National Women's Christian Temperance Union, 1730 Chicago Ave., Evanston, Ill.
New York Central System, Motion Picture Bureau, 466 Lexington Ave., New York, N.Y.
New York Department of Commerce, Film Library, 40 Howard St., Albany, N.Y.
New York State Health Department, Albany, N.Y.
New York State Youth Commission, 30 Lodge St., Albany, N.Y.
New York Stock Exchange, Dept. of Public Relations, 24 Broad St., New York, N.Y.
New York University Film Library, Distribution Dept., 26 Washington Place, New York, N.Y.
New Zealand Legation, Washington, D.C.
Nu-Art Films, Inc., 112 W. 48th St., New York, N.Y.
Nunn-Bush Shoe Company, Advertising Mgr., Milwaukee, Wis.
Official Films, Inc., 209 W. Jackson Blvd., Chicago, Ill.
Office of Inter-American Affairs; films available through Castle Films.
Office of War Information; films available through Castle Films.
Ohio Slide & Film Exchange, Dept. of Education, Columbus, Ohio.
Ohio State Dept. of Public Welfare, Mental Hygiene Information Service, Columbus, Ohio.
Ohio State University, Bureau of Education Research, College of Education, Columbus, Ohio.
Ohio State University, Bureau of Public Relations, Columbus, Ohio.
Oregon University, E. C. Brown Trust, 220 S.W. Alder St., Portland, Ore.
Pan American Union, Organization of American States, Div. of Labor and Social Affairs, Washington, D.C.

Pan American World Airways System, 28–19 Bridge Plaza North, Long Island City, N.Y.
Pennsylvania Salt Manufacturing Co., 1000 Widener Bldg., Philadelphia, Pa.
Pennsylvania State College, Audio-Visual Aids Library, State College, Pa.
Pictorial Films, Inc., 105 E. 106th St., New York, N.Y.
Portafilms, 418 North Glendale Ave., Glendale, Calif.
Post Pictures Corp., 115 W. 45th St., New York, N.Y.
Pratt & Whitney Aircraft, United Aircraft Corp., East Hartford, Conn.
Princeton Film Center, Princeton, N.J.
Progressive Pictures, 6351 Thornhill Drive, Oakland, Calif.
Projected Visual Aids, 6050 Broadway, Chicago, Ill.
RCA Manufacturing Company, Educational Dept., Camden, N.J.
Research Institute of America, Inc., 292 Madison Ave., New York, N.Y.
RKO Radio Pictures, Inc., 1270 Avenue of the Americas, New York, N.Y.
Santa Fe Railway, Film Bureau, 80 E. Jackson Blvd., Chicago, Ill.
Save the Children Federation, 80 Eighth Ave., New York, N.Y.
Shell Oil Company, 50 W. 50th St., New York, N.Y.
Sherwin-Williams Co., 101 Prospect Ave., N.W., Cleveland, Ohio.
Simmel-Meservey, Inc., 321 South Beverly Drive, Beverly Hills, Calif.
Sinclair Refining Company, 606 Wisconsin Ave., Milwaukee, Wis.
Skibo Productions, Inc., 165 W. 46th St., New York, N.Y.
Southern California, University of, Audio-Visual Service Dept., Los Angeles, Calif.
E. R. Squibb & Sons, Motion Picture Dept., 32–14 Northern Blvd., Long Island City, N.Y.
Standard Oil Company, 910 S. Michigan Ave., Chicago, Ill.
Sterling Films, 316 W. 57th St., New York, N.Y.
Sugar Information, Inc., 52 Wall St., New York, N.Y.
Sun Dial Films, Inc., 625 Madison Ave., New York, N.Y.
Swedish American Line, 636 Fifth Ave., New York, N.Y.
Swedish Travel Information Bureau, Inc., 630 Fifth Ave., New York, N.Y.
Tea Bureau Film Library, 13 E. 37th St., New York, N.Y.
Teaching Aids Exchange, Post Office Box 1127, Modesto, Calif.
Teaching Film Custodians, Inc., 25 W. 43rd St., New York, N.Y.
Tennessee Valley Authority, Information Service Staff, Knoxville, Tenn.
Texas Company, 300 Baker Bldg., Minneapolis, Minn.
Warwick M. Tompkins Films, 1046 W. Edgeware Road, Los Angeles, Calif.
Transfilm, 35 W. 45th St., New York, N.Y.
Trees For Tomorrow, Inc., 120 S. Mill St., Merrill, Wis.
Trindl-King Productions, 123 S. Bowling Green Way, Los Angeles, Calif.

United Duroc Record Association, Duroc Bldg., Peoria, Ill.
United Fruit Company, Pier 3, North River, New York, N.Y.
United Nations, Department of Public Information, Film & Visual Information Div., Room 6300 C, Empire State Bldg., 350 Fifth Ave., New York, N.Y.
United Specialists, Inc., 159 E. 35th St., New York, N.Y.
U.S. Beet Sugar Association, Tower Bldg., Washington, D.C.
U.S. Bureau of Reclamation Library, Washington, D.C.
U.S. Department of Agriculture, Motion Picture Service, Office of Information, Washington, D.C.
U.S. Department of the Air Force, Directorate of Public Relations, Pictorial Branch, Washington, D.C.
U.S. Department of Commerce, Weather Bureau, Washington, D.C.
U.S. Department of Justice, Federal Bureau of Investigation, Washington, D.C.
U.S. Department of Interior, Bureau of Mines, Central Experiment Station, 4800 Forbes St., Pittsburgh, Pa.
U.S. Fish & Wildlife Service, Dept. of the Interior, Washington, D.C.
U.S. Forest Service, Washington, D.C.
U.S. Treasury Department, Washington, D.C.
United World Films, 1445 Park Ave., New York, N.Y.
Virginia, University of, Bur. of Teaching Materials, Extension Div., Box 1487, University Station, Charlottesville, Va.
Virginia State Board of Education, Film Production Service, Richmond, Va.
Vocational Guidance Films, Inc., Carl F. Mahnke Productions, 215 E. Third St., Des Moines, Iowa.
Washington State Apple Commission, 104 W. Yakima Ave., Yakima, Wash.
Wisconsin Anti-Tuberculosis Association, 1018 N. Jefferson St., Milwaukee, Wis.
Wisconsin Electric Cooperative, 303 E. Wilson St., Madison, Wis.
Wisconsin Power and Light Company, Public Information Director, 122 W. Washington Ave., Madison, Wis.
Wisconsin Telephone Company, 122 W. Washington Ave., Madison, Wis.
Wistar Institute of Anatomy and Biology, Woodland Avenue and 36th St., Philadelphia, Pa.
Young America Films, Inc., 18 E. 41st St., New York, N.Y.

PICTURES AND GRAPHICS

Charts

Central Scientific Company, 1700 Irving Park Road, Chicago, Ill.
Clay-Adams Company, Inc., 141 E. 25th St., New York, N.Y.
Denoyer-Geppert Company, 5235 Ravenswood Ave., Chicago, Ill.

General Biological Supply House, 761 E. 69th Place, Chicago, Ill.
A. J. Nystrom and Company, 3333 Elston Ave., Chicago, Ill.
Ward's Natural Science Establishment, Inc., 3000 Ridge Road East, Rochester, N.Y.
Weber Costello Company, Chicago Heights, Ill.

Flat Pictures

Air Age Education, 100 E. 42nd St., New York, N.Y.
Art Education, Inc., 6 E. 34th St., New York, N.Y.
Artex Prints, Inc., Westport, Conn.
Colonial Art Company, 136 N.W. First Ave., Oklahoma City, Okla.
F. E. Compton Company, 1000 N. Dearborn St., Chicago, Ill.
Creative Education Society, Mankato, Minn.
General Biological Supply House, 761 E. 69th Place, Chicago, Ill.
Informative Classroom Pictures, 40 Ionia, N.W., Grand Rapids, Mich.
Instructor Magazine, Normal Park, Dansville, N.Y.
National Geographic Magazine, 16th and M Sts., Washington, D.C.
Perry Pictures Company, Malden, Mass.
Quarrie Corporation, 35 E. Wacker Drive, Chicago, Ill.

Instructional Comics

ENGLISH

Children's Digest (formerly *True Comics*), Parents' Institute, Inc., 52 Vanderbilt Ave., New York, N.Y.

Biographies of people well known in science, social service, and government. Price, 10 cents.

Classics Illustrated, Gilbertson Company, 826 Broadway, New York, N.Y.

Picture story versions of familiar English classics. Published monthly. Price, 10 cents.

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Adventure Comics, Educational Service Division, Department 6-235A, General Electric Company, Schenectady, N.Y.

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Fun in Science, School Service, Westinghouse Electric Corp., 306 Fourth Ave., Pittsburgh, Pa.

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Picture Stories in Science, Educational Comics, Inc., 225 Lafayette St., New York, N.Y.

Picture stories on general science prepared specifically for school use. Price, 10 cents.

March to Market, Educational Services, Swift and Company, Chicago, Ill.
Picture story of beef cattle from the open range to the kitchen. Free in class quantities.

Picture Stories in History, Educational Comics, Inc., 225 Lafayette St., New York, N.Y.
Picture stories on American history, European history, and elementary social studies prepared specifically for school use. Price, 10 cents.

Steel, Hill and Knowlton, Inc., 350 Fifth Ave., New York, N.Y.
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Pictorial Graphics

Graphics Institute, 300 W. 45th St., New York, N.Y.
Pictograph Corporation, 8 W. 40th St., New York, N.Y.

Posters

American Dental Association, 222 E. Superior St., Chicago, Ill.
American Forestry Association, 919 Seventeenth St., N.W., Washington, D.C.
American Humane Education Society, 180 Longwood Ave., Boston, Mass.
Atchison, Topeka, and Santa Fe Railway System, 80 E. Jackson Blvd., Chicago, Ill.
Canadian Information Service, 400 W. Madison St., Chicago, Ill.
Cunard Line, 25 Broadway, New York, N.Y.
French Line, Educational Department, 610 Fifth Ave., New York, N.Y.
General Mills, Education Section, Dept. of Public Services, Minneapolis, Minn.
Hamburg American Line, % U.S. Navigation Company, General Agents, 17 Battery Place, New York, N.Y.
National Safety Council, 425 N. Michigan Ave., Chicago, Ill.
National Travel Office, 30 Rockefeller Plaza, New York, N.Y.
Pan American World Airways, 28–19 Bridge Plaza North, Long Island City, N.Y.
Westinghouse Electric Corp. School Service Department, 306 Fourth Ave., Pittsburgh, Pa.
Wild Flower Preservation Society, Inc., 3740 Oliver St., N.W., Washington, D.C.

PROJECTORS

Filmstrip and Slide Projectors

American Optical Company, Instrument Division, Box A, Buffalo, N.Y.
Ampro Corporation, 2835 N. Western Ave., Chicago, Ill.
Argus Cameras, Inc., 405 4th St., Ann Arbor, Mich.

Bausch and Lomb Optical Company, 626 St. Paul St., Rochester, N.Y.
Bell and Howell Company, 7100 McCormick Road, Chicago, Ill.
Charles Beseler Company, 60 Badger Ave., Newark, N.J.
De Vry Corporation, 1111 W. Armitage Ave., Chicago, Ill.
Eastman Kodak Company, 343 State St., Rochester, N.Y.
Golde Manufacturing Co., 1214 W. Madison St., Chicago, Ill.
Keystone View Company, Hamilton & Crandall St., Meadville, Pa.
La Belle Industries, Inc., Ocononowoc, Wis.
E. Leitz, Inc., 304 Hudson St., New York, N.Y.
Society for Visual Education, Inc., 1345 W. Diversey Parkway, Chicago, Ill.
Spencer Optical Company, 141 Fulton St., New York, N.Y.
Spindler and Sauppe, 2201 Beverly Blvd., Los Angeles, Calif.
Viewlex, 3501 Queens Blvd., Long Island City, N.Y.

Microprojectors

Bausch and Lomb Optical Co., 626 St. Paul St., Rochester, N.Y.
Spencer Optical Company, 141 Fulton St., New York, N.Y.
Visual Aids, Inc., Columbus, Ohio.

Opaque Projectors

Bausch and Lomb Optical Co., 626 St. Paul St., Rochester, N.Y.
Charles Beseler Company, 60 Badger Ave., Newark, N.J.
Spencer Optical Company, 141 Fulton St., New York, N.Y.
Squibb Taylor, Inc., 1213 South Akard St., Dallas, Texas.

Overhead Transparency Projectors

Charles Beseler Company, 60 Badger Ave., Newark, N.J.
Screen Scriber, Visual Training Aids, 180 W. Randolph St., Chicago, Ill.

Sound Filmstrip Projectors

Du Kane Corporation, 100 N. 11th St., St. Charles, Ill.
Magnavox Company, 2131 Bueter Road, Fort Wayne, Ind.
O. J. McClure Talking Pictures, 1115 W. Washington St., Chicago, Ill.
Pacific Sound Corporation, 1524 Cahuenga Blvd., Hollywood, Calif.
Society for Visual Education, Inc., 1345 W. Diversey Parkway, Chicago, Ill.
Webster Electric Company, 1900 Clark St., Racine, Wis.
Viewlex, 3501 Queens Blvd., Long Island City, N.Y.

Sound Motion-Picture Projectors (16 mm.)

Ampro Corporation, 2835 N. Western Avenue, Chicago, Ill.
Bell and Howell Company, 7100 McCormick Road, Chicago, Ill.
De Vry Corporation, 1111 W. Armitage Avenue, Chicago, Ill.
Eastman Kodak Co., 343 State St., Rochester, N.Y.

Radio Corporation of America, Camden, N.J.
Victor Animatograph Corporation, Davenport, Iowa.

RECORDERS

Disk Recorders, 78 and 33⅓ r.p.m. Playbacks

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Lafayette-Concord Radio, 100 Avenue of the Americas, New York, N.Y.
Meissner Mfg. Division, Maguire Industries, Inc., Mt. Carmel, Ill.
Speak-o-phone Recording & Equipment Co., 23 W. 60th St., New York, N.Y.
Wilcox-Gay Corp., Charlotte, Mich.

Tape Recorders

Amplifier Corp. of America, 396 Broadway, New York, N.Y.
Ampro Corporation, 2835 N. Western Ave., Chicago, Ill.
Bell Sound Systems, 555 Marion Road, Columbus, Ohio.
Brush Development Co., 3611 Perkins Ave., Cleveland, Ohio.
Crestwood Products Co., 218 S. Wabash Ave., Chicago, Ill.
Eicor, Inc., 1501 W. Congress St., Chicago, Ill.
Magnecord, Inc., 360 N. Michigan Ave., Chicago, Ill.
Mark Simpson Mfg. Co., 32–28 49th St., Long Island City, N.Y.
Operadio Mfg. Co., St. Charles, Ill.
Pentron Corp., 611 W. Division St., Chicago, Ill.
Revere Camera Co., 320 E. 21st St., Chicago, Ill.
Tape-O-Graph Audio Industries, Michigan City, Ind.
Tapetone Mfg. Corp., 36–06 36th St., Long Island City, N.Y.
Webster Electric Co., Racine, Wis.
Wilcox-Gay Corp., Charlotte, Mich.

Wire Recorders

Air King Products Co., Inc., 1523–63rd St., Brooklyn, N.Y.
Lafayette-Concord Radio, 100 Avenue of the Americas, New York, N.Y.
Radio Corporation of America, Camden, N.J.
Wire Recording Corp. of America, 76 Varick St., New York, N.Y.

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